

# THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED  
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER  
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## The Metal Finishing Division of the Pyrene Manufacturing Company

A Unique Organization Affording the Manufacturer a Most Varied and Complete Metal Finishing Service

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WRITTEN ESPECIALLY FOR THE METAL INDUSTRY

During the last few years the finishing of metal products has received increasing attention not only from the manufacturers but from the buying public in general. This phase of the industry, though important, has always been somewhat in the background, but the realization has at last dawned on the trade that the excellence of the finish is often a deciding factor in increasing the sale of an article. The publicity attendant upon the success of a number of important metal finishing processes has also contributed largely to the education of the public on this point.

The history of the Metal Finishing Division of the Pyrene company is interesting, as it would appear that this branch of activity was somewhat foreign to the main work of the company. However this is not entirely the case, as many Pyrene products require careful attention as to metal protection and the procedure required. The many and varied conditions to be met made it necessary, quite a num-

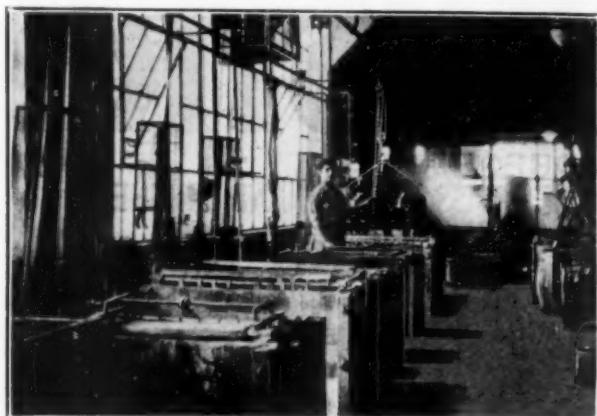
ber of years ago, to have a very complete metal finishing layout. Such improved results were obtained through the application of scientific processing of parts as to prompt the extension of this service to other concerns. The metal finishing equipment was therefore modified and enlarged and the Pyrene Metal Finishing Service offered to manufacturers in general. The increasing patronage enjoyed by this new activity resulted in steady expansion, so that today the metal finishing plant is one of the largest and most complete in the country specializing in jobbing contract work.

The Metal Finishing Division consists of the following departments: Parkerizing, enameling and plating. In the last is the Udylite Process and Chromium (Cronon) plating section; also general plating, such as nickel, copper, lead, tin, etc. There are, of course, large grinding and polishing departments and facilities for handling special plating jobs requiring the erec-



NEWARK PLANT AND OFFICES, PYRENE MANUFACTURING COMPANY

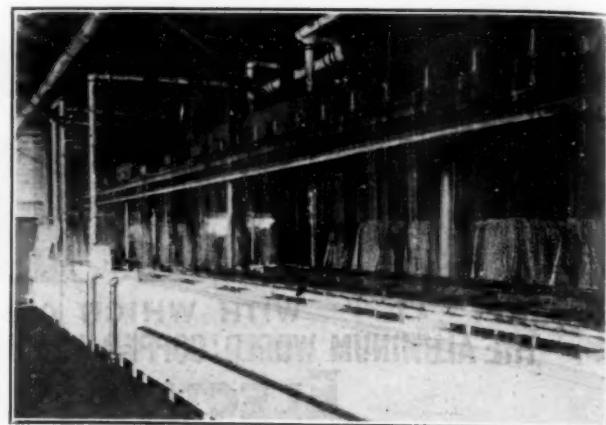
tion of special rigs or other unusual apparatus. The Parkerizing department contains a number of still and automatic barrel Parkerizing tanks, with a daily production of approximately eight to ten tons of steel and iron products. There is also ample finishing equipment



PLATING BARRELS USED FOR UDYLITE PROCESS OF CADMIUM PLATING

such as drying centrifuges, coating barrels and dipping vats of various sizes used in the production of the many different Parkersized finishes. All work is handled along an overhead track with pneumatic lifts.

Cleaning facilities are very complete, consisting of a 75 horsepower air compressor, a number of automatic sand blast barrels, and a large capacity pickling and cleaning plant. The enameling department is adjacent to the Parkerizing section and contains three large gas-heated ovens, a semi-automatic dip machine, and a number of the most modern type spray booths for the application of cellulose base enamels and lacquers. This department handles large quantities of work in any color, baked or cellulose finish. Any of the ornamental lacquer jobs or bronze powder finishes are supplied. The location of the enameling department next to the Parkerizing operations is important because of the large use made of Parkerizing for an enamel and lacquer base, particularly when applied to steel. A great deal of production is first Parkerized



FULL AUTOMATIC PLATING APPARATUS IN OPERATION



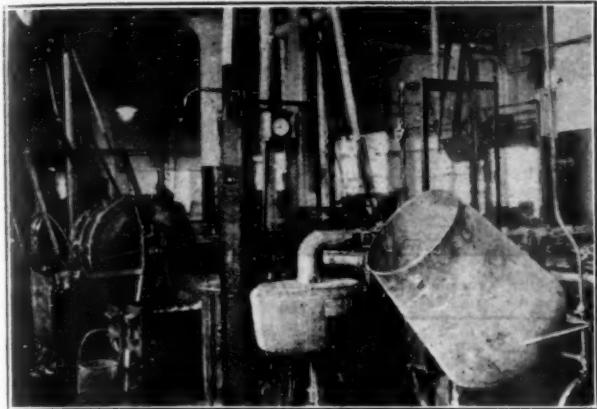
PARKERIZING SECTION. SOME OF THE CLEANING TANKS



BARREL  
SECTION.  
PLATING  
DEPARTMENT

and then impregnated with different lacquers producing colored and metallic effects largely used on ornamental and structural steel.

The plating department occupies a large space on one of the upper floors of the Pyrene building, thereby afford-



BARREL SECTION, PLATING DEPARTMENT, SHOWING TOLHURST CENTRIFUGAL DRYER, BURNISHING BARREL, OBLIQUE TUMBLER, ETC.

ing the finest ventilation and light, which are factors of paramount importance in plating operations. The Udy-lite section contains two large moving cathode tanks and a number of plating barrels of different types. The conveyor mechanism of one of the moving cathode tanks is so arranged as to permit its removal and conversion of the unit for still tank work, such as, for example, cadmium plating of long structural and ornamental steel parts like beams, stair rails, balconies, window frames and doors. The chromium plating section contains five plating tanks with a combined capacity exceeding 1,300 gallons; also, three generators providing an ample current supply. All plating tanks are equipped with the most modern type of ventilating apparatus, insuring complete freedom from disagreeable fumes. The Crodon process of chromium plating is featured and is operated under licenses issued by United Chromium, Inc. This section has been arranged so as to be sufficiently elastic for handling chromium (Crodon) plating jobs on a production basis, as well as a large number of small individual orders.

The general plating section contains still tanks and barrels of the standard type for the deposit of nickel, copper, lead and tin. There are also facilities for metal coloring and a special room for the production of special bronze finishes. There are different generators here to supply current to different tank groups, making it possible to operate at full capacity without interference or delays. Cleaning and rinsing units are grouped throughout the department feeding each tank section and insuring production flow with minimum interference.

Each individual process is the result of careful analysis, thereby insuring uniformity in the finished job and affording a basis for determining costs in advance. Pre-determined schedules govern every process and are specifically



SECTION OF ENAMELING DEPARTMENT

carried out. All procedure is under careful and strict technical control, insuring close adherence to specifications for uniformity and quality of finish. The metal finishing staff advises and recommends as to the best process or combination of processes necessary for finishing a product. If the manufacturer's needs can be more efficiently handled by an individually operated unit, a complete engineering service is supplied before and after the installation is made.

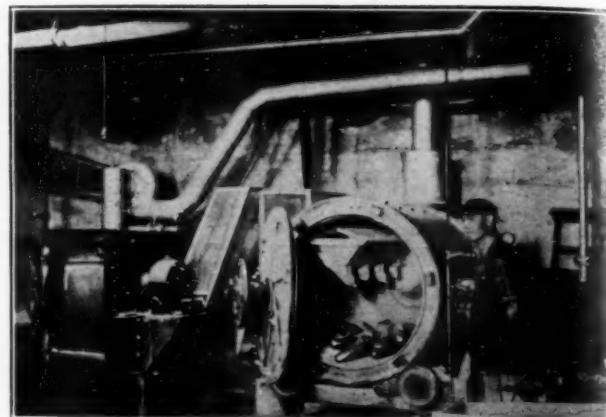
The Pyrene Metal Finishing Division acts as general representative in the New Jersey and New York territory for the Parker Rust-Proof Company, of Detroit, Michigan;



PARKERIZING SECTION.  
CENTRIFUGAL DRYER  
SHOWN AT LEFT

the Udylite Process Company, Detroit, Michigan; and United Chromium, Inc., of New York City. A general jobbing service is furnished in close cooperation with these three concerns. This extends to the installation of plants for any of the above noted processes when the manufacturer needs so require. The different processes used in daily production on contract jobbing work often makes it possible for a manufacturer to obtain a very definite idea of the possibilities of the process under consideration when installing his own plant. There is very often a production demonstration run on his own product.

Due to increasing business, the metal finishing plant will shortly be rebuilt and enlarged. The service extended is of the broadest type and numbers among its customers a great many nationally known concerns and a large number of satisfied small users.



PART OF SAND BLAST EQUIPMENT

## Standardizing Ingot Metal Purchases

### Committee Organized to Co-operate with Producers and Consumers in Developing Standard Specifications and Quotations

A meeting was held, of the Special Committee of the A. S. T. M. for the Promotion of the General Use of Specifications for Copper Alloys in Ingot Form, in Cleveland, Ohio, on November 26th, 1928. Complete reports of this meeting will be made public as soon as the minutes of the meeting have been transcribed and are available. In the meantime this early report will make public the general purposes and plans of the Committee.

This Committee was organized by the American Society for Testing Materials, to undertake a problem, presented by G. H. Clamer, president of the Ajax Metal Company of Philadelphia. The technical and trade journals publish prices of ingot metals among other commodities. It seems that the quotations published on ingot metals make no allowance for grades of the materials used, varying percentages of impurities or the tolerances permitted in composition. Consequently prices may vary widely for the same material procured from different sources. The difference in cost is the result of difference in quality in almost every case, but there is no way of determining this from published quotations.

The problem was the beginning of the work of the Committee, but as the Committee discussed the various angles, the scope of its work grew. The publication of prices for varying grades of material immediately suggested the setting of definite standards as a basis for quotation. This meant that consumers would have to be unified or far as possible in their specifications. At the present time most large consumers have their own individual specifications; most small consumers have none at all, and the consumers are largely at sea. From these suggestions, the Committee decided that it should undertake, at least in the sense of fact-finding, the promotion of the general use of specifications for ingot copper alloys.

The following plan of action was settled upon.

1. To enlist the co-operation of the Non-Ferrous Ingot Metal Institute in educating consumers to standard alloys, standard requirements and specifications with as few as possible variations from these standards.

2. To obtain all possible specifications from consumers and producers of ingot copper alloys. These specifications will be compiled and tabulated, and as soon as possible a standard specification will be submitted to the proper Committee of the American Society for Testing Materials with the recommendation that this be put through the

regular procedure for the development of standards.

In the future, it is contemplated that the American Society for testing Materials and the Non-Ferrous Ingot Metal Institute will co-operate in educating consumers, large and small, to demand certifications of quality as a basis for price quotations.

The work of the Committee described above is largely fact-finding and promotional in character. Its recommendations will, however, weigh very heavily as they will be the result of actual contact with consumers and producers.

Members of the Committee, who were present:

G. H. Clamer, Permanent Chairman of the Committee, Ajax Metal Company, Philadelphia, Pa.

C. L. Warwick, Permanent Secretary of the Committee, Secretary-treasurer of the A. S. T. M.

D. M. Avey, The Foundry, Cleveland, Ohio.

Adolph Bregman, THE METAL INDUSTRY, New York.

L. B. Case, General Motors Corporation.

W. S. Doxsey, Daily Metal Trade, Cleveland, Ohio.

W. B. Price, Scovill Manufacturing Company, Waterbury, Conn.

Mr. Rooney,

W. Romanoff, H. Kramer and Company, Chicago, Ill.

S. P. Trench, American Metal Market, New York.

F. L. Wolf, Ohio Brass Company, Mansfield, Ohio.

A complete report will be published, probably, in the next issue of THE METAL INDUSTRY.

### Calcined Soot

Q.—Will you please let us know what is meant by calcined soot? This is a term used by plasters a great many years ago and we are wondering whether by calcined soot they mean lamp black, bone char or some other form of a carbon powder.

A.—Calcined soot as used by plasters a number of years ago is nothing more than the soot that accumulates on the inside of the chimneys of large manufacturing plants, wherever a soft, gaseous coal is used. As the material is taken from the chimneys, it is, as inferred, calcined by heat. In other words, it is glowed by heat. Any ordinary soot as taken from a chimney where soft coal is burned can be used. It is not necessary to calcine.

—CHARLES H. PROCTOR.

## Rubber Binders for Foundry Cores

### Bureau of Standards Discovers a New Class of Core Binders. Abstract of Letter Circular No. 252, Bureau of Standards—Conclusion\*

#### VULCANIZATION

While there are possibilities in the idea of adding powdered sulphur, sulphur in carbon bisulphide or the use of sulphur chloride, and hardening the rubber bonded core by heating to bring about vulcanization, the difficulties in the way of producing a core finally bonded by hard rubber are many, and these possibilities are not to be realized at present.

#### BALATA CORE-BINDER

Rubber is not the only substance of the rubber group that can be used as core-binder. Guttapercha and balata, the latter being usually more readily obtainable in the market, may be similarly used. These materials, which are used in the manufacture of belting, golf balls and insulation for submarine cables, differ from rubber in that they contain a high content of resins, are not vulcanized, and they have the peculiar property, not possessed by rubber, of softening at temperatures in the neighborhood of 100° F. and hardening again on cooling.

This offers a means of restricting the fire hazard to the single operation of tempering the sand, and simplifies the problem of solvent recovery.

Balata, dissolved in benzol in about the same proportions and by the same method as is described above for rubber, may be mixed with core sand, selected with proper reference to sieve analysis, and when the binder is thoroughly distributed over the sand, the solvent may be evaporated. The unrammed sand does not stick together and may be stored like ordinary sand. By thus treating the sand in a mixing room so arranged as to be free from fire hazard, no solvent is brought to the core bench and there is no further fire hazard.

When it is desired to mold the core, the balata-covered sand is heated by steam coils or on a hot plate, with stirring to secure uniform heating. As the temperature rises to that at which the balata becomes plastic, the sand begins to matt together slightly and a heap of it will "crawl." The plasticity is retained to so low a temperature that hand ramming can be done without discomfort. The warm sand rams just like the rubber bonded sand. After the core is rammed it is allowed to cool, and as soon as it is cold, the core is ready for use. Thus, instead of core-baking, core-cooling is required.

The balata cores have, for a given amount of bond, about the same strength and properties as the plain rubber cores previously described, and disintegrate equally well after the metal freezes. Notwithstanding the fact that the binder gets plastic on heating, no trouble has been met in the cores failing to hold their shape against the metal and the castings come true to the cores.

The present price of balata is about twice that of milled smoked rubber. The difference in price may perhaps be made up by the greater simplicity of solvent recovery and the reduced fire hazard. The prices of benzol and aviation gasoline ordinarily do not differ greatly.

#### SPECIAL "THERMOPRENE" CEMENT

A special cement has been placed on the market recently, one of its chief uses being to fasten sheets of rubber to metal surfaces, as in lining tank cars with rubber.

This cement is a proprietary article sold under rather stringent restriction as to the applications that may be made of a given purchase. It is a specialized, and so far, a high-priced material. The material is said to be a rubber isomer (that is, have a similar ultimate chemical composition to rubber, but a different molecular arrangement) obtained by heating rubber with para-phenolsulphonic acid or sulphuric acid.<sup>2</sup>

The material has been given the general name of "thermoprene" because the products have the thermo-plastic behavior of gutta-percha and balata of softening with heat. The change can be controlled so as to produce harder or softer products. It is stated that reclaimed rubber reacts so that this may be an outlet for old tires. The only material of this type which has so far been tried by the Bureau for core binders is "Vulcalock cement," prepared by the B. F. Goodrich Company, Akron, Ohio. It is rumored that similar materials made by others are or will be available, but none has yet been tried by the Bureau. It appears very probable that a product of this general nature, as suitable for a core binder as the Vulcalock cement, but prepared with the special object of making a core binder, might be produced by more economical methods than those required when the production of an adhesive is aimed at, and thus the price brought to a point where it might more readily compete with other core binders. Since balata-like thermoplastics are said to be produced by the acid treatment, the scope of the application of core binders of the balata type and avoidance of fire hazard, may be enlarged when such materials are available on the market. No development of the "thermoprenes" has as yet been made with core binders in view and the only experience with materials of this class as core binders at the Bureau has been with the commercial "Vulcalock."

#### CORE MAKING WITH THE SPECIAL CEMENT

The sand should be dry and of suitable sieve analysis as discussed above. The Vulcalock cement is mixed with the sand as was described under plain cement. The sand, after proper mixing, does not stick to the core boxes even though the pure cement has strong adhesive qualities.

The sample of Vulcalock cement used, on mixing with a weighed amount of dry sand and drying to constant weight at 100° C. lost 82%, indicating that it contained 18% thermoprene and 82% solvent. Diluting the Vulcalock cement with benzol to a 9% rubber solution and by using 3½ parts of this to 40 parts sand (92 sand, 8 Vulcalock) by volume, the strength developed is much greater than with the plain rubber cement. With Vulcalock, increasing the binder tends to give strength, whereas with plain rubber cement the core tends to become too flexible if the amount of binder is increased too far.

Especially noteworthy is the high strength obtained with sand No. 2. Eight parts of a 9% Vulcalock cement by volume to 92 parts No. 2 sand on air drying 3 hours produced a core whose compressive strength was 105.0 lb. per sq. in., and air drying 24 hours 89.2 lb. per sq. in. The strength of an oil core used at the Washington Navy Yard made of 92 parts sand (¾ No. 2 sand, ¼ No. 1

<sup>2</sup> Fisher, H. L., Conversion of rubber into thermoplastic products with properties similar to Gutta-Percha, Balata and Shellac, Ind. Eng. Chem. Vol. 19, 1927, p. 1325.

\*Part 1 appeared in the issue of November, 1928.

sand), 4½ parts flour, 3½ parts linseed oil by volume, or 30 parts No. 2 sand, 10 parts No. 1 sand, 2 parts flour, 1½ parts linseed oil, sand tempered to 6% water, core baked at 200° C. for 1 hour. This oil-flour core had a compressive strength of 86½ lb. per sq. in.

#### MIXING PLAIN RUBBER CEMENT AND VULCALOCK CEMENT

Since high strength can be obtained by the use of Vulcalock cement, obviously graduations of strength can be secured by using suitable mixtures of the two.

The straight Vulcalock cement or the mixtures act similarly to the plain rubber or balata as to easy break-up of the bond after casting. However, the extremely strong Vulcalock cores do not disintegrate in lead castings, but do in higher melting alloy castings. This is shown by items 13 and 14 in the table below.

Items 3 to 8 were included to show the effect of clay bond; it will be noted that all the Bentonite-bonded specimens, whether in cast iron or lead, were so hard after the metal was poured that they had to be chipped out of the castings. It will also be noted that the oil and flour core required chipping out from both metals.

#### CONCLUSION

By use of the rubber, balata, or "thermoprene" type of core binders it is possible to make, without any baking, cores of strengths varying from perhaps double that of the ordinary green sand core to that comparable to the strength met in baked oil sand cores. The strength is very materially affected by the grain size (sieve analysis) of the core sand and it is not yet possible to state, without trial, whether a given core sand will be suitable for making high-strength cores with the rubber binders. By experiment and selection of the right sand and the right proportion of binder cores suitable for almost any sort of casting of any ordinary foundry, alloy can be produced which will come away from the castings without the necessity of chipping-out.

The fire hazard is the chief drawback to the plain rubber and Vulcalock binders. This can be minimized by the use of balata.

The cost cannot be definitely stated. Milled smoked rubber at the moment of writing costs 20 cents to 30 cents or more a pound, depending on quantities purchased. Balata costs about twice as much. No quotation on Vulcalock cement for this purpose is available. On this the B. F. Goodrich Company should be consulted. Compared to the cost of linseed or other drying core oils, the cost of the rubber binders should not be out of reach and when the cost of cleaning out cores is considered, may show a saving. If the cores are found serviceable it may be expected that the binders will appear on the market so that the user may not be forced to make up his own solutions of rubber or balata.

Trial of the rubber type of binders is recommended for castings in which present core binders show high cost for removal of cores.

Owing to the newness of the use of the rubber type of core binders many questions will arise which cannot yet be definitely answered, and for which the best answer will come from accumulated shop experience. It is hoped that foundrymen who try out the binders will report their experience to the Bureau of Standards, Metallurgical Division, Washington, D. C., stating the sieve analysis and clay content of the sand used, the proportion of binder used, the strength and permeability of the resulting cores, and the sort of castings in which the cores so made were found to be satisfactory or unsatisfactory. Sufficient data of this sort would make it possible to specify much more definitely than can now be done the proper type of sand and the proper amount of binder to use to make the best cores.

Finally, it is necessary to point out again that the solvents used are flammable and that all experiments made should be carried out with precautions to avoid fire.

The discovery of the useful properties of rubber and similar materials as core binders is due to C. M. Saeger, Jr. The experimental work recorded herein was carried out under his direction largely by C. H. Kerwin and L. D. Jones. Acknowledgment is also due W. H. Smith of the Chemistry Division for his helpful advice in the preparation of the new core binders.

#### PROPERTIES OF RUBBER CORE BINDERS Compressive Strength

Sand Number Item (table)	Core Mixture Parts Sand: Binder	Compressive Strength						Behavior of core on shaking out.
		Green strength just after molding lb./in <sup>2</sup>	24 hours air drying lb./in <sup>2</sup>	Baked Permeability lb./in <sup>2</sup>	Moldability	Metal Cast		
1	1 Rubber	92:8 40 3½	2.4	10.8	444	Very good	Iron	Very good, sand free flowing
2	1 Balata	92:8 40 3½	3.0	12.1	376	Very good	Iron	Very good, sand free flowing
3	1 Bentonite	96:4 96 4	2.8-6% H <sub>2</sub> O	19.8	325	Fair	Lead	No good, sand tooled out, baked hard
4	1 Bentonite	96:4 96 4	2.9-8% H <sub>2</sub> O	23.8	257	Fair	Iron	No good, sand tooled out, baked hard
5	1 Bentonite	92:8 92 8	5.7-4% H <sub>2</sub> O	16.8	347	Good	Lead	No good, sand tooled out, baked hard
6	1 Bentonite	92:8 92 8	5.1-6% H <sub>2</sub> O	28.4	315	Good	Iron	No good, sand tooled out, baked hard
7	1 Bentonite	88:12 88 12	7.1-6% H <sub>2</sub> O	21.7	308	Good	Iron	No good, sand tooled out, baked hard
8	1 Bentonite	88:12 88 12	6.8-8% H <sub>2</sub> O	30.8	271	Good	Lead	No good, sand tooled out, baked hard
9	1 Vulcalock	92:8 40 3½	2.2	22.8	449	Good	Lead	Baked, sand tooled out
10	1 Vulcalock	92:8 40 3½	2.2	22.8	449	Good	Iron	Very good, sand free flowing
11	2 Rubber	92:8 40 3½	4.3	12.2*	202	Very good	Lead	Very good knocked out
12	2 Balata	92:8 40 3½	2.6	8.8	178	Good	Lead	Good, knocked out
13	2 Vulcalock	92:8 40 3½	3.5	135.0	136	Very good	Lead	Sand tooled out, binder not entirely burned out
14	2 Vulcalock	92:8 40 3½	3.5	135.0	136	Very good	Iron	Very good, sand free flowing
15	30 parts No. 2: 10 parts No. 1: 2 parts flour: 1½ parts linseed oil Tempered 6% H <sub>2</sub> O, Baked at 200° C.	for 1 hour 92: 3½ oil 4½ flour	.80	8.1 86.7 108	{ Fair Fair	Lead Iron	Hard, had to be tooled out Hard, had to be tooled out	
16	3 Rubber	92:8 40 3½	1.3	6.2	32	{ Good Good	Lead Iron	Very good, sand free flowing Very good, sand free flowing
17	3 Rubber	92:8 40 3½	1.3	6.2	32	{ Good Good	Lead Iron	Very good, sand free flowing Very good, sand free flowing

\* 8.1 in another test, same sand but another lot of binder.

Rubber binder = 1 lb. rubber in 2 gals. gasoline = approx. 7% rubber.  
Balata binder = 1½ lb. balata in 1 gal. benzol = approx. 14½% balata.

# The Production of White Bearing Metals and Tin Solders from Scrap Metals

## Methods of Purifying and Mixing Scrap to Produce Marketable Alloys—Part 3, Conclusion\*

By EDMUND R. THEWS  
Consulting Engineer

WRITTEN ESPECIALLY FOR THE METAL INDUSTRY

The foregoing description of melting processes is understood to apply to pure melting pot plants only. They are quite thoroughly modified if reverberatory furnaces are available, which, apart from their much larger capacities, are altogether more favorable in technical and economical respects to the melting pot processes as generally carried out at present.

In principle, the methods applied for the removal of copper and zinc in reverberatory furnaces do not differ from those applied in melting pot plants. For really efficient working, two different types of furnace are required, the first type, used for the removal of the impurities being the ordinary flat hearth reverberatory used for elutriation purposes, while the second furnace possesses a deep hearth suitable for perfect segregation of the different alloying constituents. This latter type of reverberatory is shown in cut.

The raw bearing metal scrap or the blast furnace pig is charged into the flat hearthed furnace (of 5-15 tons capacity), melted down, and brought to a bright red heat (850°C, 1560°F) as quickly as possible. In order to remove the zinc, the metal is then puddled energetically until the blue flames generated by the burning zinc have ceased to appear. To prevent excessive oxydation of the tin along with the zinc throughout this first part of the process, the heating up of the metal as well as the puddling and cooling down must be carried through with all available speed and by taking all possible preventive measures counteracting oxydation. The raw material must be charged into the preheated and bright red furnace and the furnace cooled down at once after the removal of the zinc, by extinguishing the fire, opening all working doors, and—if compressed air is available—by blowing cold air into it. The danger of oxydation of valuable metals may also be minimized—although not prevented, by any means—by maintaining an absolutely neutral or even slightly reducing furnace atmosphere, gas and oil being the most efficient combustibles for this purpose.

If arsenic is present in the bearing metal this method is modified by treating the red hot metal directly after the removal of zinc with thin iron wire or other small section iron scrap. This is charged into the furnace in small lots and moved to and fro for a few minutes. Two washings of this kind are usually sufficient for the removal of the ordinary quantities of arsenic present in bearing metal. It is entirely visible, of course, to combine this treatment with the dezincification process, thus reducing the time during which the metal is subjected to the high temperature required.

The final cooling of the metal proceeds until a crust about  $\frac{1}{2}$  inch thick has formed on the surface of the bath. The remaining liquid metal is tapped from under the crust, while the hard crust is freed from all the soft

white metal contained by gradually increasing the furnace temperatures, the remaining black material being melted and tapped. The hard material is placed in storage until enough has accumulated to make up a special charge. The above described refining process is then repeated and the white metal still contained, removed. The residual material, now very rich in copper and relatively poor in lead and tin, is placed onto the inclined hearth of the empty furnace and all the rest of the white metal contained liquated by raising the temperature to about 650-700°C (1200-1300°F). The furnace is then closed and the hard residue melted and tapped. This product contains 40-55 per cent of copper. If the elutriation process has been carried through with due care, and if, in this case, the amount of lead contained does not exceed 3 per cent, the hard alloy is used as base alloy for the production of high class bearing metals, such as the composition

80 per cent Sn, 15 per cent Sb, 5 per cent Cu which must be as free from lead as possible, of course.

The economical advantages connected with the use of Glanz Metal for this purpose are too evident to be discussed here, since this metal does not only contain the copper and a large amount of the antimony required, but comparatively large quantities of tin which are thus obtained practically free of charge (if compared to the price of virgin tin).

The white metal alloy obtained by this reverberatory process of refining is absolutely free of zinc and arsenic, and contains about 0.10-0.20 per cent of copper. It is possible, of course, to reduce the copper contents still further by producing a crust thicker than  $\frac{1}{2}$  inch, but this is not necessary at this stage of the process, since the final process of elutriation or segregation will remove a certain percentage of the remaining copper.

Attention should here be called to the fact that besides the removal of the impurities mentioned, a concentration of tin in the white metal is also attained, since the coppery crust separated contains a comparatively large amount of antimony and a correspondingly smaller proportion of tin, so that the white metal obtained contains a higher percentage of tin and lead than the raw white metal alloy charged.

### PRODUCTION OF TIN ALLOY

The final process of production of tin alloy in the reverberatory furnace may be carried out by two methods, each of which permits of certain variations depending upon the melting plant available and upon the quantity and composition of tin alloy produced.

Wherever the daily capacity does not exceed one or two tons, the old elutriation process will prove most efficient. Technically, it is entirely possible of course, to get this average production by making one charge of 15 tons or so in a large furnace every 8 or 10 days, but this would mean a very considerable waste of heat, besides possessing

\* Parts 1 and 2 were published in the issues of September and November, 1928.

several disadvantages which will become apparent later on.

This eliquation process may be carried out in any small reverberatory furnace possessing a flat hearth and permitting of a fairly efficient regulation of heat. Most favorable working conditions are obtained if the hearth declines towards the fire bridge, the tap hole being located at the hottest point of the hearth. During the first part of the process lignite or even wood should be used as fuel in order to be able to attain the even flow of low heat required.

Before charging the white metal pigs, the furnace is kept at an even heat of about  $175-185^{\circ}\text{C}$  ( $345-365^{\circ}\text{F}$ ) for at least 2 hours in order to preheat the hearth. The pigs are then piled up at the further end of the hearth and as straight as possible in order to make sure of as uniform a heating of the pigs as possible. Soon, sweating commences and the tin alloy eliquated gathers on the hearth. The tap hole should be kept closed, since on account of the cold air drawn through an open tap and the very low temperature of the alloy eliquated, the white metal flowing through the tap in a very thin stream is usually cooled down sufficiently far to solidify and close up the tap hole. This may be avoided by applying a gas flame to the mouth of the tap which may be kept sufficiently reducing to prevent further oxydation of the tin.

After the fusible metal eliquated at the low temperature of the furnace has all been removed, this is raised by about  $15^{\circ}\text{F}$  and eliquation continued. The next raise of temperature amounts to  $20^{\circ}\text{F}$ , and the final eliquation temperature, to  $30^{\circ}\text{F}$ . The metal remaining is melted together and added to a raw charge for refining.

The products of each temperature interval are collected separately in order to assure of a perfectly separated and uniform product.

The main disadvantages incurred by this method are the discontinuity of the process, the smallness of each charge, the length of time required for each run, the relatively high consumption of fuel, and the necessity of employing one man specially for attending to the firing and the operation of the furnace.

These disadvantages may be eliminated to a large extent by modifying this primitive process by adding to the furnace plant a relatively large melting pot holding 2-4 tons. The eliquation of the metal in the furnace, instead of taking place at the melting temperature of the eutectic alloy, is then carried out at  $190^{\circ}\text{C}$  ( $375^{\circ}\text{F}$ ) thereby increasing considerably the speed of eliquation of the fusible alloy which flows into the melting pot where it is then finish treated, as described above. It is clear that since the metal in the pot represents a very fusible alloy, the yield is very high and the various disadvantages recounted for the ordinary melting pot treatment are not nearly as pronounced in this case.

#### SEGREGATION PROCESSES

The disadvantages connected with the operation of the segregation process in the melting pot—as commonly practised—has gradually led to the development of this process in reverberatory furnaces, a development quite natural, if it is considered, that by the process of refining above described it is possible to continue the cooling of the metal until it has reached a temperature of about  $360^{\circ}\text{F}$ , that is to say, until the entire charge has separated into an upper hard layer comparatively rich in copper and antimony and the eutectic alloy containing about 55 per cent of tin, 40 per cent of lead, 3.5-3.7 per cent of antimony, and 0.1-0.15 per cent of copper. The logical development of this principle in connection with the logical construction of the reverberatory furnace used has led to the elaboration of the modern, technically and economically perfect tin alloy process. A large German

residue smelter, the Hüttenwerke Tempelhof A. Meyer has been trying to patent the original process but has met with the energetic resistance of a large number of other German smelters and the number of law suits ensued will doubtlessly keep the courts busy for a long time to come. However, in view of the strict practice of the German Patent Office to patent only new ideas and to refuse to patent all processes which represent a logical development of well-known principles and processes it is difficult to see how the Hüttenwerke Tempelhof A. Meyer will be able to carry their suit to a successful end.\*

The process in question is carried out in the furnace shown in Fig. 3 which is distinguished by considerable depth of hearth designed to permit of a better separation of the crystallized hard material from the liquid eutectic alloy remaining.

The operation of the furnace is simple enough. The refined white metal is charged into the preheated furnace and melted until the hearth is filled. Firing is discontinued and the metal permitted to cool off until the tem-

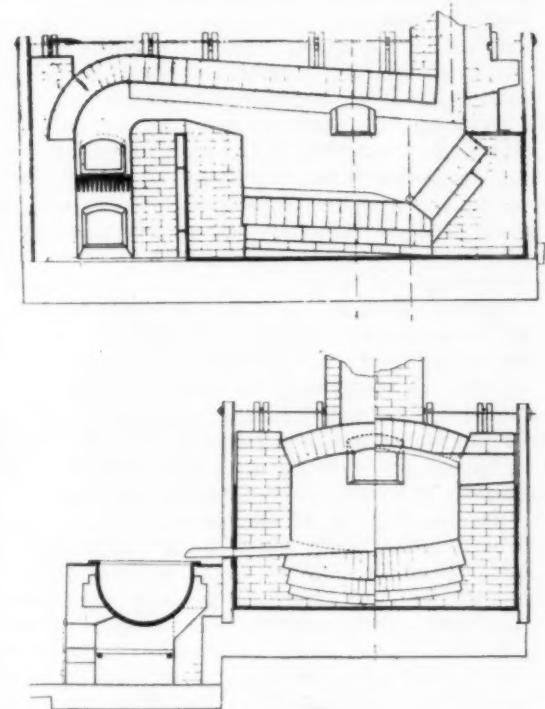


FIG. 3—FURNACE USED FOR SEGREGATION PROCESS

perature of crystallization of the eutectic is reached. This is tapped, and firing recommenced as carefully as possible so as to raise the temperature of the metal by  $15^{\circ}\text{F}$ . The fraction of the metal fused at that temperature is also tapped, the temperature again raised by  $20^{\circ}\text{F}$ , and finally by  $30^{\circ}\text{F}$ , the different fractions of alloy representing the first, second, third, and fourth degree tin alloy. Since the first tapped fraction is usually better than the commercial tin alloy, it is mixed with the second fraction, while the third and fourth fractions are used to make up future charges.

The author has found that this operation of the process, that is to say, the method which is now the subject of the patent struggle in Germany, possesses a number of serious faults and that much better results are obtained by

\* An agreement has now been concluded between The Hüttenwerke Tempelhof A. Meyer and the other smelting works producing tin alloy, by the terms of which these smelters agree to recognize the priority of Meyer's claims and his right to a patent, while in return they are empowered to continue with the production of tin alloy. Nothing is known as to the financial arrangements of this agreement, but it is understood that, besides paying a considerable penalty, the smelters in question had to interest The Hüttenwerke Tempelhof A. Meyer in their future production of tin alloy.

following modification which cannot possibly be covered by the patent since it involves a combination of a number of well-known principles only.

The process is carried out in an ordinary large reverberatory furnace holding at least 10 tons of metal and possessing a hearth at least 15 inches deep. This furnace is provided with a melting pot forehearth of 5-7 tons capacity. Above the deepest part of the hearth a hole, about 1 inch of diameter is drilled into the roof of the furnace.

The furnace is preheated for three hours at a temperature of about 1550°F, the hearth filled with the refined white metal, firing stopped and the furnace and metal cooled down as quickly as possible. As soon as the furnace has become quite dark and the temperature of the metal is about 750°F, a pyrometer is introduced through the hole in the roof and inserted so as to leave the tip of the pyrometer about 2 inches above the hearth.

The metal is skimmed free of dross and the temperature permitted to fall until it has reached about 188°C (370°F) when the metal is tapped and finish treated in the melting pot.

From the above description of the various processes for the production of tin alloy it will have become clear to every practical metallurgist that of all the methods in use the melting pot process is the most practical, and there can be no doubt that if this is developed so as to eliminate the chief difficulties, the reverberatory processes will not be able to seriously compete with it.

The white metal should be refined in the reverberatory furnace and this refining process be carried out so as to raise the tin contents of the alloys to about 50 per cent (by letting the thickness of the coppery layer develop to a thickness of about 1 to 2 inches, depending upon the tin contents of the bath).

The pots should be connected up with a warm air flue and some provision made to remove the liquid tin alloy at once after its separation from the solidified hard material.

#### POURING OF ALLOYS

The pouring of bearing metals does not require any special considerations as far as the producer is concerned, since this is sold to the consumers in shape of pigs only.

Soldering metals, on the other hand, are delivered ready for use by the producer and since in very many cases the price and saleability of solder depend more upon the appearance of the strips than upon its real qualities, sufficient care must be exercised to bring out the good qualities of an alloy whilst the less satisfactory ones should be masked.

The appearance of solder strips are influenced by the pouring temperature of the metal, the temperature and conductivity of heat of the mold, the composition of the metal, and the special treatment of the metal previous to pouring.

The general influence of temperature as expressed by the various individual factors above enumerated may be condensed down into one sentence: The slower the rate of cooling of the metal, the better the appearance of its surface. Thus the first few sets of strips cast into the cold mold are not as good as the rest and should be returned to the pot. If large quantities of soldering strips are to be produced, the metal must not be cooled artificially, but the number of molds should be increased until at a naturally slow rate of cooling the pouring process may be carried out practically continuous. A set of 8-10 molds of 10 strips each will suffice to keep one man and a boy well employed.

The pouring temperature of the metal should be rather high, but not too high. As a rule, a temperature about

75-100°F above the melting temperature will be about correct. With a 50/50 solder, the pouring temperature would thus be about 475°F.

It is clear from the above that the shape of the strip, that is to say, its cross-section, must also be of influence to the appearance of its surface. The thinner and flatter the strip the more rapid the setting and the less satisfactory the surface appearance.

The conductivity of heat of the material of the mold is the most important temperature factor determining the appearance of the solder strips, and it is not surprising in view of this fact that the mold material generally used, cast iron, is about the most disadvantageous material possible. A bad conductor of heat, such as marble, gives a much better surface than iron. Indeed, many alloys which if poured into iron molds at ordinary temperatures possess a spotty surface will be of perfect appearance if poured about 50°F hotter in a marble mold. The marble mold should be set in an iron box and be fairly hard.

The mechanical properties and the appearance of the solder may be much improved by a suitable treatment of the metal previous to pouring. The alloy is made up according to requirement and melted down at as low a temperature as possible, mixed, and skimmed. The temperature is then increased by about 100°F and the metal poled with green wood. After removing the dross, the surface may be covered with a little resin.

Whilst this work may be accomplished successfully with the ordinary melting pot plant, a much better control of temperatures as well as of the entire pouring process is possible by the special constructions brought out by many firms.

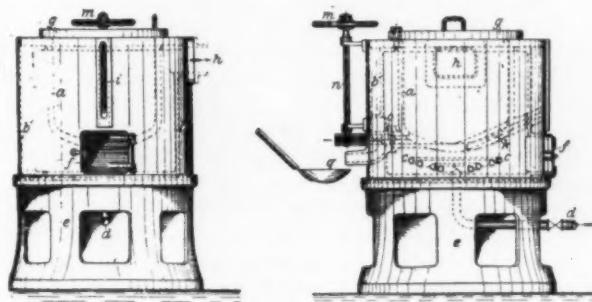


FIG. 4—CONSTRUCTION OF MELTING POT

Fig. 4 shows a construction of melting pot much used in Europe, in which "a" is the cast iron melting pot surrounded by the double walled jacket "b." The pot is fired with gas which is conducted to the burner "c" through the pipes "d." The burner is fastened to the lower part "e" of the furnace and may be reached through door "f." The double walled mantle of the furnace serves to prevent undue radiation of the heat of the furnace by air isolation. The gases of combustion are drawn off through "h." The temperatures of the metal are measured with a nitrogen thermometer "i" provided with an iron casing. This thermometer may be inserted into the channel "k" reaching into the center of the pot. The metal in the pot is protected against the deteriorating influence of the air by a cover "g." It is tapped at the lowest part of the pot, the tapping mechanism consisting of the hand wheel "m," spindle "n," and cone "o" which regulate the flow of metal passing out at "q."

If the tin solder is to be used in one's own works or if thin sticks are ordered without specifying certain shapes, the sticks may very easily and rapidly be produced without the use of molds. One side of a large hand ladle is flattened out, and a row of perforations made along the

upper edge of the flat side. The ladle is then filled up to the level of the holes with metal, and, in tilting it so that the metal flows through the perforations, it is drawn over an iron plate, leaving behind it as many thin streams of solder as there are holes in the ladle.

Quite frequently there is a demand for powdered tin alloy, the production of which, on account of lack of necessary machinery, is usually left to some special firms. This material may be produced quite simply by the following method:

A ladle filled with the metal is taken from the pot, and, stirring constantly with a wooden stick, is left to cool until the alloy becomes quite pasty. It is then quickly

emptied into a strong linen bag, the upper part of which is twisted around until the metal fits tightly into the bottom portion. If the metal is now beaten with smart, quick taps, turning the bag steadily, it will fall apart and become a gritty powder within a few minutes. Best results are obtained with hard wood hammers.

If the metal is poured into the bags at the right time—that is, a few moments before solidification—these will not be damaged considerably, and may be used over again a large number of times; at the same time the powder produced will be rather white, while, with too hot a pouring temperature, the powder will become dark or even black, from the carbonized particles of the bag.

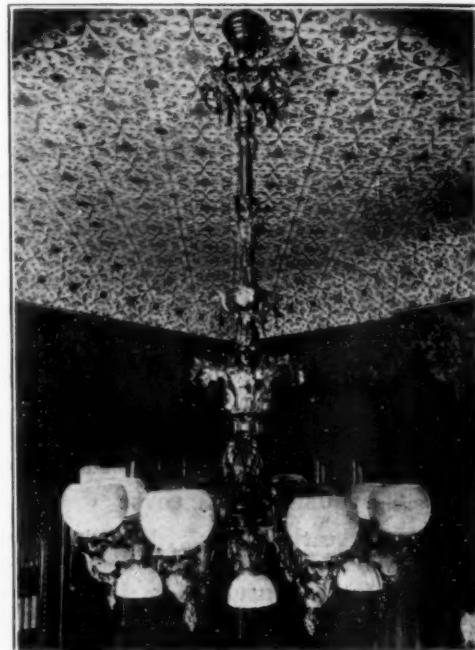
## A Centennial Chandelier

In going about the country even in remote places a traveler at times runs across remarkable examples of old metal work. The illustrations here tell the story of a grandiose brass chandelier, which is located in the grand old Packer homestead at Mauch Chunk, Pennsylvania.

The chandelier was put on exhibition at the Centennial in Philadelphia in 1876, and was awarded first prize. It was afterwards bought by Asa Packer and placed in his mansion, and is there today. As originally designed, the chandelier was equipped only for gas, but it was later shipped to a brass works in New England and electric fixtures were added. The picture of the mansion shows a dwelling of a former period, and the chandelier is suitable for a house of that time.

As Mr. Packer was identified for many years with the industries of Pennsylvania, and was the founder of Lehigh University, we append a short sketch of his career.

Asa Packer was born at Mystic, Connecticut, December 29, 1805, and located in Mauch Chunk in 1833. He engaged in boating, boat building and merchandising. Later he became associated in the early mining of anthracite coal. He completed his achievements in the building of the Lehigh Valley Railroad and in the incorporation of that company, of which he held the presidency until his death on May 17, 1879. Mr. Packer also founded Lehigh University at Bethlehem, Pa. Under the will of Mrs. Mary Packer Cummings, the last of the Packer family, who died in 1912, the Packer mansion and grounds were donated to Mauch Chunk Borough and endowed as



PRIZE CHANDELIER

a memorial to the Hon. Asa Packer, founder of the Packer estate.



PACKER HOMESTEAD, MAUCH CHUNK, PA.

# The Fundamentals of Brass Foundry Practice

## A Description of the Basic Laws Which Control the Melting and Casting of Metals and Their Application to Practical Foundry Work—Part 19\*

By R. R. CLARKE  
Foundry Superintendent

WRITTEN ESPECIALLY FOR THE METAL INDUSTRY

### ADVANTAGE OF BOTTOM POURING

With all these and other points against it, however, bottom gating is in many cases a most happy solution of metal delivery and a practice to which the author has long resorted and with which he has fared well. Among its more important advantages are its placid delivery, its skimming function, its lesser tendencies to entrap air, gases, and dross in the casting metal and the greater compactness of its delivered metal. This compactness of delivery is a strong factor of the running of a casting. Instances could be cited where by this compactness castings have been fully run from the bottom that failed to run from the top. Placid delivery is another active influence toward results. It is easier by far on the mold

check on the sprue pressure in its effect on the rate of current through the delivery gate into the mold.

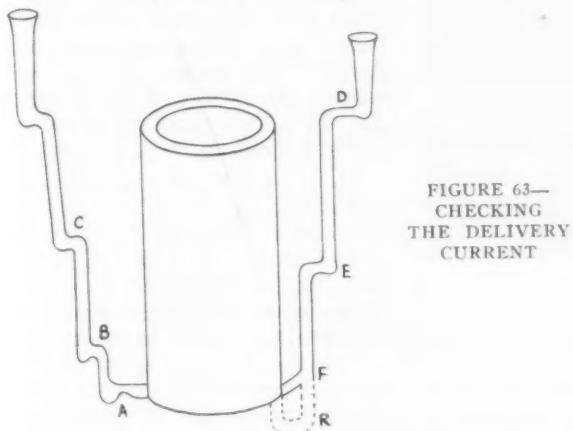
Fig. 63 shows several possibilities. The check consists in narrowing the gate channel so as to relieve the delivery of the violence and quantity of current. If the delivery A be narrowed and then widened back of the delivery point the current in the mold is considerably tamed. By narrowing the connection gate B a more pronounced effect materializes. By narrowing at D the current into the mold becomes still more gentle. A serious objection to checking too far up in the sprue, however, is that it confines metal in mass too far from the delivering point, greatly chilling the delivered metal and retarding the filling of the mold by minimizing the height of drop sprue metal and reducing the pressure of pouring accordingly. A gate checked at D for instance would run the mold very slowly as compared to the same gate checked at A or B. Another possibility of checking is to bottom gate through thin gates in multiple. This cuts down the quantity of delivered current in any one mass, though the velocity of current through these thin gates will be quite marked. The author regards the checking at B and the delivery gate as at F or R dotted line as the preferable practice. A further feature of good practice is to send the horizontal delivery gate A or F in at a tangent rather than at right angles with the mold wall, thus allowing the current to spend its force in the mold unobstructedly.

Bottom gating skims metal by the power of the metal in the drop sprue to float particles lighter than the metal on the sprue surface and thus keep it out of the casting. The tendency of the bottom pour to keep all gases ahead of the rising metal surface is too plain to require analysis.

The impact of metal dropping from the top to the bottom of a deep mold is greater than might often be expected. A five foot perpendicular drop for instance gives metal a striking velocity at the bottom of 18 feet per second and includes a momentum 18 times the striking metal mass. When it is remembered that a mold properly constructed cannot include that condition of sand softness at its bottom as will satisfy a metal force of this severity, the advantage of relieving the casting mold of this impact becomes the more outstanding. In the bottom gate we have two distinct advantages over this effect of impact: first, we can partition the gate and break the fall; second, we can condition the hardness of the gate sand surface more nearly to the exactions of the impact.

Summing up the gating point solution it might be generally taken that the point or points at which a mold will most safely and satisfactorily receive clarified metal with respect to its full and unimpaired casting filling is the point or points at which the metal ought to be delivered.

This series will be continued in an early issue.—Ed.



and decidedly favorable to the metal itself. Almost any metal under agitation will work up froth and dross from out its body—to a greater or less degree. This tendency is unusually strong in aluminum and those alloys of its basic constituency as well as the copper-aluminum alloys like aluminum bronze, manganese bronze, etc. Wherever aluminum is at all prominent the author has found it a point of difficulty to realize a clean machined surface on a casting and has traced this difficulty largely to the commotion of the metal in pouring by which froth and dross worked to the top casting surface. With this in mind his practice is invariably to cast these more particular surfaces in the drag of the mold and take every means to deliver the metal with a maximum of placidity. Primarily these precautions consist in "stepping" the metal down gradually to the mold's lower points and in putting a

\* All rights reserved. This series will be collected and published in book form. Parts 1 to 18, inclusive, were published in our issues of July, August, September, October and November, 1926; January, February, March, April, May, August, September, November and December, 1927; and March, April, May, August, and September, 1928.

# Electrodeposition of Aluminum

## A Description of Experiments on the Electrodeposition of Aluminum from Organic Solutions

By D. B. KEYES, SHERLOCK SWANN, Jr., W. KLABUNDE, and S. T. SCHICKTANZ

University of Illinois, Urbana, Ill.

A PAPER PRESENTED AT THE INSTITUTE OF CHEMISTRY OF THE AMERICAN CHEMICAL SOCIETY, EVANSTON, ILL., AUGUST 8, 1928. REPRINTED FROM INDUSTRIAL AND ENGINEERING CHEMISTRY, OCTOBER, 1928.

It has been known for some time that pure aluminum will resist ordinary atmospheric corrosion. It has also been known that pure aluminum is little attacked by certain concentrated acids such as nitric and acetic. It has been found that sulfur compounds in ordinary petroleum will not corrode aluminum tubes to any appreciable extent even at high temperatures. Unfortunately, pure aluminum has a low tensile strength and, what is worse, a low elastic limit. It is therefore very unsatisfactory as a structural material, even though it is not attacked by many corrosive agents. However, if it were possible to electroplate aluminum on steel or other common metals, the resulting material would be extremely useful for many different purposes.

### POSSIBLE USES OF ALUMINUM PLATE

One of the possible uses of aluminum plate is for steel economizer tubes. These tubes contain water inside and

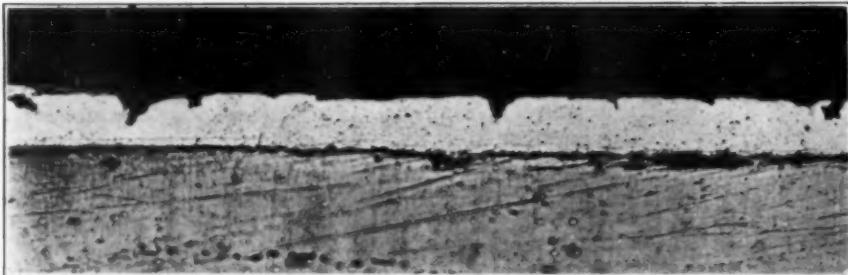


FIGURE 1—PHOTOMICROGRAPH OF PLATE. 500 X

hot flue gases on the outside. Flue gases, especially those used in the Middle West, contain large amounts of corrosive sulfur compounds due to the high sulfur content of the coal in this territory. Aluminum electroplating on the outside of these tubes should save a vast sum of money which is now spent in replacement of ordinary iron tubes. Other possible uses to prevent corrosion due to sulfur compounds are for lining tubes and reaction chambers used in cracking stills and for the inside of locomotive smokestacks.

It is impossible today to store compressed gases in an iron cylinder and have them remain pure. Volatile impurities are formed by chemical action with the iron. An aluminum plate on the inside of these steel cylinders would probably remain inactive.

There are many pieces of chemical equipment now in common use which, if plated with aluminum, would stay in service for a much longer time. In brief, aluminum-plated steel would mean a material of high tensile strength, great elasticity, and resistant to corrosion—a material all industries would find useful. With this object in mind the problem was attacked.

### THEORETICAL

After several unsuccessful attempts to electroplate in the usual manner—i.e., out of aqueous and non-aqueous solvents—it was decided to attack the problem along the lines of low melting aluminum organic compounds.

The first type of aluminum compound suggested consisted of an alkyl ammonium halide combined with an aluminum halide. The second type of compound was a Grignard except that magnesium was replaced with aluminum.

### EXPERIMENTAL

**ELECTROLYSIS OF ALUMINUM GRIGNARD COMPOUND—** Aluminum was reacted with ethyl iodide according to the method described by Grignard and Jenkins<sup>1</sup> to give diethyl aluminum iodide and ethyl aluminum diiodide. These compounds were treated with dry ether, with care to keep out all moisture, and the resulting complexes were electrolyzed, using an aluminum anode and a copper cathode. A smooth coating of aluminum was deposited when the electrodes were 1 cm. apart, the current density 0.02 ampere per sq. cm., the voltage 40 volts, and the temperature 20° C. The reaction chamber was cooled by means of an ice bath.

**ELECTROLYSIS OF TETRAALKYL AMMONIUM BROMIDE WITH ALUMINUM BROMIDE—**Tetraethyl ammonium bromide was mixed with aluminum bromide, heated in a vacuum to drive off all moisture, and electrolyzed with a copper cathode and an aluminum anode in the same chamber. The electrodes were again 1 cm. apart, the current density 0.2 ampere per sq. cm., and the voltage 16 volts. The temperature was maintained 100° C. by an oil bath. Under these conditions a deposit of aluminum was found on the cathode, but it was quite evident that conditions had not been reached for the proper character of deposit as this deposit was only partially adherent. Some aluminum was found in the solution after the electrolysis.

Research will be continued along these lines.

<sup>1</sup> Compt. rend., 179, 89 (1924).

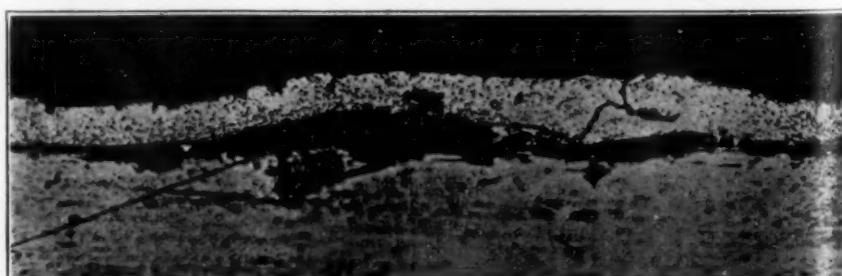


FIGURE 2—PHOTOMICROGRAPH OF PLATE AFTER BUFFING. 500 X

## CHARACTER OF A SAMPLE PLATE

Figure 1 shows a cross section of aluminum plate over copper. The sample was etched with 0.5 per cent hydrofluoric acid. The plate has evidently a fine grain structure. The faint line running parallel to the copper surface in the aluminum plate may indicate the tendency of the copper to alloy with the aluminum.

Figure 2 shows a cross section of the aluminum plate on copper after the plate has been thoroughly buffed. It should be noticed that the plate pulled away from the surface of the copper, but stayed intact.

In figure 3 is reproduced the x-ray diffraction pattern of the aluminum layer in the underlying copper electrode. In order to obtain the diffraction lines characteristic of aluminum alone, the specimen was adjusted so that a beam of x-rays defined by pinholes impinged at a small grazing angle of incidence upon the surface of the aluminum. Under these conditions the beam penetrated only the aluminum, since the pattern is free from effects due to the rolled copper sheet. The pattern demonstrates the following facts:

1—The half rings correspond to the lattice of pure aluminum, face-centered cubic, with a unit crystal cell  $4.04 \times 10^{-8}$  cm. on a side.

2—The deposit is made up of small crystals in random orientation, as shown by the uniform intensity of the rings; in other words, the conditions of deposition were such that the grains did not grow in a parallel or fibered manner in the stream lines of the current, as has been observed for nickel, iron, lead, and other metals under certain conditions. This signifies that the aluminum film is free from any directional properties and is undoubtedly closely adherent.

3—The grain size is uniform and within the range of  $10^{-4}$  to  $10^{-5}$  cm.

It has been suggested that this general method of electroplating might be utilized in atomic weight investigations of metals because of the purity of the product as indicated by the x-ray diffraction patterns.

## POSSIBILITIES OF METHOD

It is believed that this general type of electroplating will eventually solve the problem, not only of electroplating aluminum but of many other metals which were thought to be impossible to deposit as an electroplate. The substitution of this method for the common water-solution method will probably mean in certain cases an increase in efficiency of operation and the production of a superior plate. In order to develop these ideas, the authors will attempt electroplating of titanium, tungsten, iron, and chromium.

## ACKNOWLEDGMENT

The authors wish to express their appreciation to T. E. Phipps for his valuable ideas, to S. K. Colby, president of the American Magnesium Company, for the photomicrographs, and to G. L. Clark for the x-ray photograph.



FIGURE 3—X-RAY DIFFRACTION PATTERN OF PLATE BY SURFACE REFLECTION METHOD

## New Specifications on Non-Ferrous Welding Rods

The Federal Specifications Board, Washington, D. C., is adopting and promulgating purchase specifications for commercial commodities purchased by the various departments and establishments of the United States Government. These specifications, in the formative stage, are submitted to representative manufacturers for their comment and criticism.

We are, therefore, enclosing, the above mentioned specification, with the suggestion that you either print it in its entirety, or abstract it if sufficient space is not available, or that you announce it by title only, as you may wish.

It is now proposed to revise U. S. Government Master Specification for Rods, Welding, Non-ferrous, for Gas Welding, F. S. B. Specification No. 269. The Technical Committee on Metals has recommended such revision.

It is proposed to change the chemical requirements of Aluminum Alloy, Type E, under Detail Requirements, Section IV, Page 2 of the Specification, to read as follows:

## ALUMINUM ALLOY—TYPE E.

	per cent
Aluminum	minimum 92.5
Silicon	4.5-6.0
Iron	maximum 1.0
Copper	maximum 0.6
Zinc	maximum 0.2
Manganese	maximum 0.2
Magnesium	maximum trace

The present chemical composition of Aluminum Alloy reads as follows:

## ALUMINUM ALLOY—TYPE E.

	per cent
Aluminum	91.0-93.0
Copper	7.0-9.0
Iron	maximum 1.5
Other elements	maximum 1.0

The Federal Specifications Board would be glad to receive any comments or suggestions as to changes which may be thought to be desirable in the specification; such comments or criticisms will have to be received by the Board not later than December 15 if they are to receive attention of the technical committee considering this subject.

## Nichrome Plating

Q.—Did you ever hear of nichrome plating? Somebody is doing it. If you know who it is and whether or not they are located in the middle west, I will be glad to have the information.

A.—We have never heard of nichrome metal being successfully deposited. The metal is commonly used as a resistance factor in electric current control; also, more or less, as an acid resisting metal. It is an alloy of nickel and chromium. "Crodon," a patented chrome alloy plate now being exploited, might possibly be a nichrome alloy or a chromium cobalt alloy such as "Stellite."

It would appear to us that chromium may possibly be deposited more readily as an alloy with nickel or cobalt. Unfortunately, we are unable to give you, at this time, any further data on the subject of depositing nichrome.

—CHARLES H. PROCTOR.

## Steel Anodes for Chromium Plating

The Steel Having the Lowest Carbon Was Most Resistant to Corrosion; and Electrolytic Iron Was More Resistant Than Steel. The Equilibrium Concentration of Trivalent Chromium Was About the Same for All of These Anodes.

By E. M. BAKER and E. E. PETTIBONE

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and Senior in Chemical Engineering, Respectively.  
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A PAPER PRESENTED AT THE FIFTY-FOURTH GENERAL MEETING OF THE AMERICAN ELECTRO-CHEMICAL SOCIETY, HELD AT CHARLESTON-HUNTINGTON, W. VA., SEPTEMBER 20, 21, AND 22, 1923.

The anodes commonly used for chromium plating are steel and lead. It is the purpose of this paper to present some results of a study of steel and electrolytic iron anodes, in a chromic-acid chromium plating bath.

### EXPERIMENTAL PROCEDURE

The apparatus consisted of a rectangular copper pan in which were placed five beakers, surrounded by a heating bath of kerosene oil. This oil was heated by means of immersed nichrome coils regulated to within  $\pm 1^\circ$  C. by thermostat. A small motor-driven stirrer circulated the oil and insured uniform heating. The solutions in the beakers were covered with a 6 mm. layer of kerosene oil to reduce fuming. This had no effect on the operation of the bath, except to lessen the loss of solution.

The anodes were round rods 9.5 mm. in diameter, while the cathodes were spirals of wire. These were suspended from fiber strips. Connections were made on these strips so that all the anodes and cathodes were in series, and therefore the same current passed through each. To obtain various anode current densities, the anodes were immersed in each case to the desired depth. The areas of the cathodes were adjusted to give bright plates at the currents and temperatures used.

To obtain a variation of carbon content, electrolytic iron and S. A. E. 1020, 1045 and 1095 steel anodes were used. These steels actually contained 0.21, 0.54 and 1.05 per cent carbon, respectively. The electrolytic iron anodes were made by depositing a 3 mm. plate on a 6.5 mm. low-carbon steel rod, and then annealing at a red heat to eliminate hydrogen. After this, they were turned down to 9.5 mm. diameter. The iron plating solution and method used were those described by W. E. Hughes.<sup>1</sup>

The solutions used for these experiments consisted initially of chromic acid (2.5 molar) and sulfuric acid (0.05 normal). The solutions were analyzed for hexavalent and trivalent chromium from time to time during the course of the experiments. As the layer of kerosene oil practically prevented mechanical loss of solution, the volume of solution remained constant and the sulfate concentration was assumed to also remain constant for the series of experiments on one anode. The temperature of the plating solutions was maintained at 44° to 46° C.

### RESULTS

The rates at which the anodes dissolved were expressed as anode current efficiencies. The calculations were based on the assumption that iron dissolved as trivalent iron, and that this represented the only loss in weight of the anodes. While such an assumption is obviously not rigor-

ously true, this method of presenting the data has some advantages.

In Fig. 1 there is shown the relation between anode current efficiency (as defined above), and ampere-hours for each of the anodes. Distinctive symbols are used to indicate the current density for each point plotted. It will be noted that between the ranges of 3.6 and 21.6 amperes per square decimeter, the anode current density does not greatly affect the anode current efficiency. Other workers have shown that this generalization does not extend to much lower current densities.<sup>2</sup>

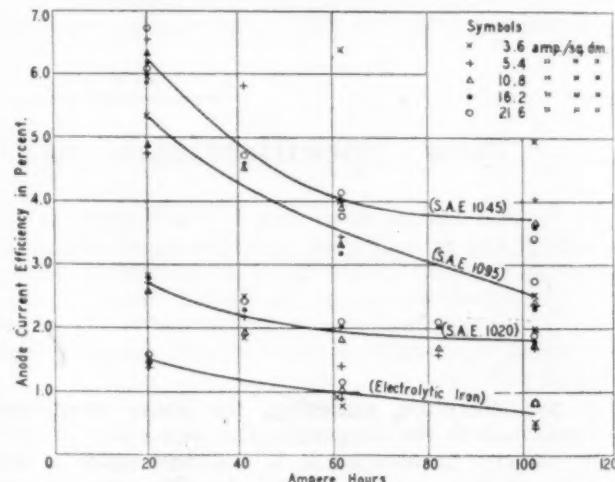


FIG. 1. DROP IN ANODE CURRENT EFFICIENCY WITH TIME.

The graph shows quite clearly that electrolytic iron is the most resistant to corrosion (lowest anode current efficiency), that mild steel is next best, and that moderate and high carbon steels are corroded so rapidly as to be entirely unsuitable for use in a chromic-acid chromium plating solution. The anode current efficiency was in all cases much higher when the anode was new than after it had been in service.

The decrease in anode current efficiency with age was most pronounced with the more impure anodes. In the case of the steel anodes this may be partly due to the removal of more soluble components of the anode near the surface. The decrease in anode efficiency of the pure electrolytic iron anode, however, shows that this is not the only cause of the decrease. Presumably, a protective oxide or chromate coating is formed by the continued passage of current.

<sup>1</sup> W. L. Pinner, unpublished research; and R. Schneidewind and S. F. Urban, Trans. Am. Electrochem. Soc., 53 (1928). Preprint 16.

<sup>2</sup> Modern Electro-Plating, pages 48 to 54.

TABLE I.—EFFECT OF ANODE COMPOSITION ON RATIO OF TRIVALENT TO HEXAVALENT CHROMIUM.

Temperature 45° C. 23° ampere hours per liter of solution.				
Current Density	Trivalent Chromium* g./L.	Hexavalent Chromium* g./L.	Ratio of Trivalent to Hexavalent Chromium	Composition of Anode
33	24.0	121.5	0.197	Electrolytic iron
50	25.9	125.0	0.207	Electrolytic iron
100	25.6	124.6	0.206	Electrolytic iron
200	28.7	129.5	0.222	Electrolytic iron
33	32.4	129.8	0.249	S. A. E. 1020 steel
50	27.9	123.9	0.225	S. A. E. 1020 steel
100	30.2	127.5	0.237	S. A. E. 1020 steel
150	25.3	122.9	0.206	S. A. E. 1020 steel
200	30.5	129.0	0.232	S. A. E. 1020 steel
33	32.8	170.0	0.193	S. A. E. 1045 steel
50	39.6	175.5	0.226	S. A. E. 1045 steel
100	35.8	175.5	0.213	S. A. E. 1045 steel
150	32.8	156.5	0.209	S. A. E. 1045 steel
200	32.6	154.0	0.212	S. A. E. 1045 steel
33	25.6	160.0	0.160	S. A. E. 1095 steel
50	35.1	169.0	0.208	S. A. E. 1095 steel
100	30.0	158.0	0.190	S. A. E. 1095 steel
150	32.9	157.0	0.210	S. A. E. 1095 steel
200	29.4	154.0	0.191	S. A. E. 1095 steel

In Table I there is shown the analysis of the plating solutions, for trivalent and hexavalent chromium per liter of solution, after approximately 230 ampere-hours had been passed. The fourth column shows the ratio of trivalent to hexavalent chromium, and it will be noted that this ratio is substantially constant.

#### CONCLUSIONS

The carbon content of the anode, from 0 to 1 per cent, does not seem to have any effect on the ratio of trivalent to hexavalent chromium in the bath.

Carbon in the anode increases the rate of anode solution, the effect of a small increase in carbon content being most marked when the iron is most nearly free from carbon. Carbon is like other impurities in an iron anode,<sup>3</sup> then, in markedly decreasing its resistance to anodic corrosion in a chromic-acid chromium plating solution.

\* Calculated as grams of metallic chromium per liter of solution.  
<sup>3</sup> O. P. Watts, *Trans. Am. Electrochem. Soc.*, 52, 177 (1927).

#### Steel Bus Bars

Q.—We have been using steel for contact bars in our plating barrels. We know that this is incorrect, theoretically, but have had very good results. We would like to get at this matter with more accuracy and less guesswork and wonder if you will give us the following information:

Is there any reason why copper should be used instead of steel provided the steel conductor is large enough to carry the same amount of current? We understand that it takes about ten times as much ordinary soft steel as copper to carry the same amount of amperage. Is this correct and does this mean cubical content of the metal or surface exposed?

What is the amperage required at six volts to plate a two-peck load of steel stampings weighing about 75 pounds? What would be the size of copper bar required to carry this amount at six volts and what would be the size of a soft steel bar required?

A.—If you have used steel bars for carrying current in your plating barrels with satisfactory results, why change? The reason copper is used for contact bars or rods almost universally is because the metal has high conductivity.

Iron and steel are among the metals used for resistance. A copper rod or bar of a given surface area has ten times the conductivity of a steel or iron rod or bar of the same surface area. On the other hand, the same iron or steel

rod resists the flow of the electric current ten times as much as the copper rod or bar of the same surface area.

You are correct in assuming that soft steel rods or bars should be ten times the diameter of copper rods or bars to carry the same amperage with the same resistance. The surface exposed, not the cubical content of the conductor is the factor. We are unable to give you the amount of amperage required at 6 volts to nickel plate a 2-peck load of steel stampings. We do not know the total surface area of such a tank load. We do estimate that not more than 2 amperes per square foot of surface area are used at 6 volts. Approximate the surface area and determine the amperage total, then be governed accordingly. The more amperes you can carry the less time required for plating. The carrying capacity of copper conductors used in electroplating is as follows:

Amps.	Round Rod	Square Rod
	Inches	Inches
50	1/4	3/16
100	3/8	5/16
200	1/2	7/16
300	5/8	1/2
400	11/16	5/8
500	3/4	11/16
750	1	7/8
1000	1 1/8	1
1500	1 3/8	1 1/4
	1 1/8	1 7/16

It is cheaper to use copper conductors. If it were not, soft steel would be used more extensively in carrying high currents.

CHARLES H. PROCTOR.

#### Chromium Plating on Gold

Q.—I am sending you a sample of a chromium solution which I have prepared according to a formula that was published in your magazine. This solution was stated to be good for chromium plating on 18-karat white gold. I have tried it out but find that it does not work satisfactorily as I have it. It covers some parts of rings but leaves other places uncovered. In some cases, the insides of the rings were covered but if I left them in the solution long enough to get the outside coated, the insides turned very dark. I wonder if you can help me?

A.—The formula for your chromium solution is probably as good as any for your class of work. There are several factors that must be studied and controlled before results are satisfactory and the most important of these are temperature, amperage and the sulphate content of the bath.

The throwing power of the solution depends upon these three factors,—especially upon the sulphate content. There should be about one part of sulphate to 100 parts of chromic acid. Our analysis shows your solution to contain approximately this amount. An increase in temperature lowers the throwing power, therefore it is advisable to use as low a temperature as you can and still obtain a bright deposit. A high amperage causes a burnt deposit and this must be regulated accordingly. We would suggest that you increase your chromic acid content to 28 ozs. per gallon and use the solution at a temperature of 105° F.

The success of chromium plating depends upon a study of the above mentioned factors. Until these have been thoroughly mastered, do not expect perfect results.

There is no complete treatise published on gold plating. All of the books on plating advertised in *THE METAL INDUSTRY* from time to time contain more or less information on same.

—O. J. SIZELOVE.

# The Copper Industry and Its Progress Since the War

## Copper's Campaign Back to Normalecy; What It Has Done in 1928; and the Outlook

By WILLIAM G. SCHNEIDER

Copper and Brass Research Association, New York

A PAPER DELIVERED BEFORE THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, NOVEMBER 22nd, 1928

At the end of the inflationary period following the war, the copper industry was in a difficult position with extremely large stocks of metal above ground. This was in the form of refined copper, in process, scrap and material to be reclaimed. Stocks of refined copper exceeded 300,000 tons, and I do not think it would be a gross exaggeration to say that probably one billion and a half pounds of copper were available above ground. Opening up of mines and productive capacity all along the line was at least 10 years in advance of peace time needs. At this time all production of any consequence ceased.

Due to the war time use of copper for munitions, markets that had used the metal were now closed to it and substitutes were everywhere being used. Only meager statistical information was available relating to the industry. Realization of the situation resulted in steps that have brought the industry back to its present position, which is certainly encouraging.

The American Bureau of Metal Statistics was formed in 1919 and from then on has furnished statistics to the industry that have been of tremendous importance and help.

It became more apparent at this time that if the copper producer was to market his product and dispose of the large surplus, educational work was necessary to acquaint the consuming public with the merits of copper and its alloys. For this purpose the Copper & Brass Research Association was organized and started functioning in 1921. It has continuously carried on its work and I am going to tell you something about its efforts and the results obtained.

Its advertising has been directed to the ultimate consumer, distributor, jobber, manufacturer, metal worker, architect, builder engineer and, in fact, to any and every one that might have occasion to consider the use of copper. Its propaganda efforts all along the line have met with an excellent response.

It has conducted commercial research surveys. There are many methods of compiling statistics. Such data as the Association has gathered is based on actual facts and figures submitted to it. They are offered with the assurance that conservatism and accuracy were never lost sight of. Some industries recently investigated are:

The oil heating industry, which uses about 5 million pounds of copper per year. The use of such burners is increasing and affords an outlet for additional copper.

The automobile industry will use, in 1928, over 228 million pounds. As the use of buses and trucks increases we may expect a corresponding increase in the quantity of copper used.

A new use for copper discovered in recent years is in the construction of burglar-proof bank vault doors. Commercial copper and specially treated copper afford a means of making vaults practically impenetrable. A market for 50 million pounds annually is indicated.

The radio industry will consume in 1928 almost 30 million pounds. Electric sets, and power speakers which are now really coming into their own, use considerable

copper and indicate an even larger consumption in the future. Television and new developments tied up with the radio industry offer possibilities for future tonnages.

The electric refrigerator whose use is becoming more extensive year by year, is gradually consuming more and more copper and in 1928 will use about 35 million pounds.

Electrification of railroads in this country and abroad means outlets for the metal that will absorb a tremendous tonnage. The recently announced electrification of the Pennsylvania Railroad will require about 55 million pounds of copper for the 1,300 miles of track. Electrical development in this country and the world over is just coming into its own—and electricity means copper.

In building, copper, brass and other copper alloys have made remarkable gains. In 1922 with a total building volume of \$4,920,000,000, this industry consumed 164 million pounds of copper. In 1926 with a building volume of about \$5,500,000,000, copper consumption increased to 275 million pounds, a growth of 111 million pounds, or 68%. Some idea of the tremendous growth based on actual figures, is given by the consumption of brass pipe. Previous to 1921 consumption of brass pipe for handling domestic water was negligible. In 1923 it had increased to 16,821,400 lbs.; 1924, 25,828,500; 1925, 39,296,500; 1926, 53,446,800; 1927, 62,934,300; 1928, estimated 75,000,000.\*

The Copper & Brass Research Association is continually seeking new markets for copper and its alloys which, as time goes on, will require a great deal of metal. Copper for radiators in the home will most certainly, in time, require a large tonnage, because of their reduced weight and smaller size as compared to cast iron.

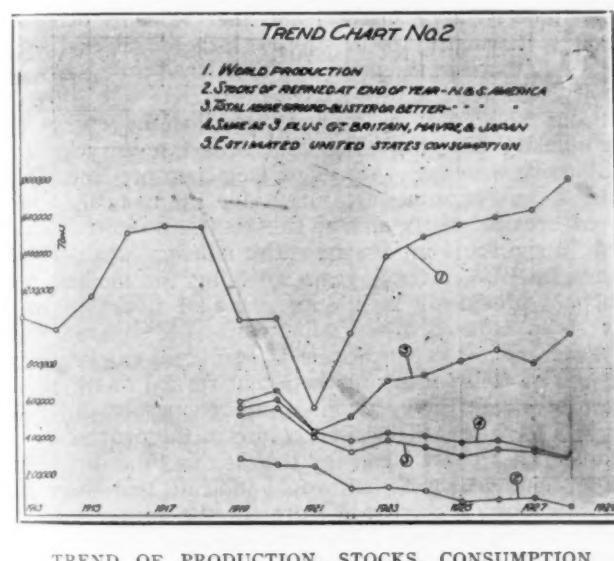
Copper for locomotive fireboxes and flue tubes is an outlet of great importance. There are many other such developments that the Association has underway. Problems relating to the welding of copper and its alloys have been given technical consideration, and this development means no small additional consumption of copper in many industries and for many purposes. There are many other problems that are having the attention of the Association and which will, if successfully solved, go a long way toward increasing the consumption of copper and its alloys.

Paralleling the work of the Copper & Brass Research Association in this country, in 1925 the Japanese Copper & Brass Research Association got going and in 1927 the German Copper Institute was formed. The work of the German Copper Institute, based on work of the American Association, has rendered an impetus to the German copper and brass industries which is of no small importance when considered from the standpoint of increased copper consumption abroad. Educational efforts of a similar kind are under way in France and in Belgium. The English copper and brass industries are also getting started and ultimately, when the entire machine is smoothly functioning, a great organizing effort will have been completed.

\* For a graphic representation of this growth see THE METAL INDUSTRY, August, 1927, page 330.

The Webb-Pomerene Act permits unified selling abroad. In 1926 the copper producers organized Copper Exporters, Inc., which soon had the foreign situation well in hand. It soon eliminated the influence exerted on the price of our entire production by about 100 million pounds of standard copper. It is needless to say that with this corporation handling foreign sales certain service must be rendered to the purchaser and in this respect Copper Exporters, Inc., has functioned perfectly. On every side one now hears praise regarding its activities and the wonderful manner in which it is handling an exceedingly difficult job. When it first started it was looked on with suspicion, especially abroad, but this feeling has turned to utmost confidence.

In November, 1927, the leading copper producers organized the Copper Institute. The purpose of this organization is "To aid the copper industry through wider knowledge and a clearer understanding of the economic factors affecting production, manufacture, distribution and consumption of copper, and copper products, and to further this object by creating an agency for the collection, compilation, dissemination and publication of accurate information concerning copper and copper products, and the industrial and commercial conditions bearing on the production, distribution, marketing, uses and consumption."



The Institute will also endeavor to "encourage the adoption of fair trade usages and practices to be followed in the copper business." It is specifically understood that nothing is to be done that may in any way be contrary to the laws of this country. Commenting on the formation of the Institute it was stated: "The formation of the Copper Institute . . . is expected to serve as one of the greatest stabilizing factors in the domestic market, since it will practically eliminate all guesswork and place the marketing of metal on a scientific basis."

With the American Bureau of Metal Statistics, the Copper & Brass Research Association, foreign trade associations interested in increasing the consumption, Copper Exporters, Inc., and the Copper Institute functioning, is it any wonder that the copper industry is out of the rut and in a better condition than ever before, and that today the outlook is indeed reassuring not only to the industry itself but to the holders of its securities?

The individual units making up the copper industry have striven to the utmost to effect a reduction in the cost of producing the metal, and have achieved phenomenal results. Vertical integration has played its part; further steps in this direction are more than likely. Beyond

question, the copper industry today is operating on a mass production basis as never before.

The tools with which the industry works are interesting but more so are the results achieved and what they indicate at present and for the future. It is not my purpose to burden you with many statistics. The attached charts should be considered merely as indicating the trend. I believe that is what is really of interest to us. It is difficult, if not impossible, to forecast with any assurance future developments, because of possible new mines, competitive materials, curtailment or increase in the use of the metal in certain markets, and many other factors that have a vital bearing on any industry.

On Chart 2, graph No. 1 shows world production of copper from 1913 and including 1928. It is estimated that the world production of copper for 1928 will amount to about 1,840,000 tons. This is an increase of about 165,000 tons over 1927. Graph No. 2 shows the stocks of refined copper at the end of each year. It is believed that such refined stocks by January 1st, 1929, will be slightly above 40,000 tons, taking into consideration advance sales, and if it is at all possible to prevent it, in no event will they go below this level.

Export shipments for 1928 also show an increase and will probably total about 700,000 tons.

From Graph No. 1 it is plainly indicated that the world production of copper must be increased. It is estimated by 1934 the world production of copper must be about 2,240,000 tons as compared to 1,840,000 tons for 1928. If in the meantime the demand for copper is pressing as during last October, the law of supply and demand will regulate the immediate price, as well as the price over a period of years.

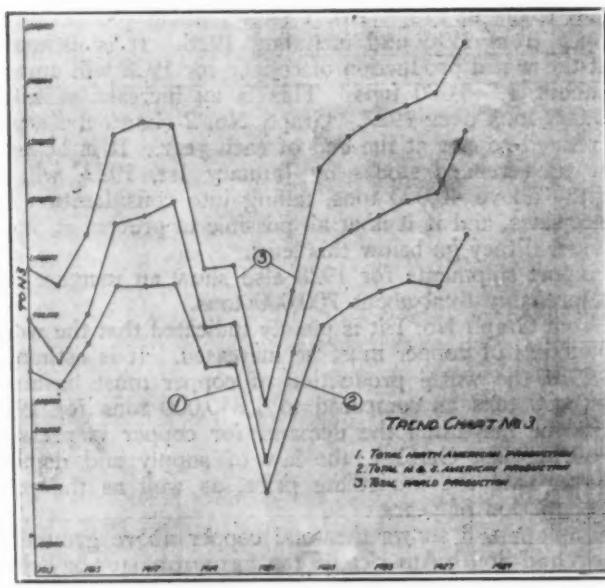
Graph No. 3 shows the total copper above ground in North and South America, in the form of blister or better. The difference between tonnages represented on graph No. 3 and graph No. 2, measured on the 1927 ordinate (January 1st, 1928) is approximately 250,000 tons, and represents the copper in process which, if the rate of production is to be maintained, cannot be reduced. It will be noted that for 1928 (as of January 1, 1929) the tonnage difference as shown between graph No. 3 and No. 2 has increased to 300,000 tons. This is an estimated increase of 50,000 tons of metal in process. This is predicated on an increase in copper production of from 10 to 15% during the last month of 1928, and indicates that the mining end of the industry will be working at 100% of capacity. The falling off of stocks during the year to an extremely low point, would certainly indicate that more production was needed in order to maintain the balance between demand and supply spoken of in the early part of this paper.

Graph No. 4 shows the total quantity of copper above ground as blister or better, not only of North and South America but also includes that above ground in Great Britain, Havre and Japan. It is significant that at the 1925 ordinate stocks in Great Britain, Havre and Japan amount to about 75,000 tons. Since then, January 1, 1926, such foreign stocks, made up principally of standard copper, have been gradually reduced until by January 1st, 1929, they will, it is estimated, amount to about 10,000 tons. There need be no further anxiety as to standard copper in London having a material effect on the price of the entire production of the United States.

Graph No. 5 shows estimated United States consumption. It is believed that during 1928 the country consumed close to one million tons of copper, which is an increase of 160,000 tons over 1927 and 100,000 tons over 1926. It is the largest tonnage of copper ever consumed by this country in any one year. This consumption of copper is sure to keep increasing unless the proper steps toward finding new markets or holding old ones are neg-

lected. I feel that for a long time to come the copper industry will remember the past seven years and will not again let things "go by the board." The continuance of active sales promotion activities through its various Associations, is recognized by the leaders of the industry as absolutely essential and will be continued for many years to come.

On Chart 3, graph No. 1 shows total North American Production, graph No. 2 total North and South American production, and graph No. 3 total world production. It is plainly indicated that North America is producing more copper than ever before, South America is producing more



TREND CHART OF COPPER PRODUCTION

copper than ever before, and that the world is producing and consuming more copper than ever before. There is no indication that the world will produce less—or in other words consume less—in the immediate future; on the contrary it is reasonable to expect greater production and consumption than ever before.

The foregoing data is based on figures compiled by the American Bureau of Metal Statistics, covering the first ten months of 1928.

As copper and its alloys do not rust, a great deal of metal finds its way back as secondary metal. For every

pound of new copper produced, there is being handled in addition slightly more than one half pound of secondary metal. As time goes on the secondary metal situation will become even more important to the industry as a whole than at present.

There are markets for copper at any price, irrespective whether it is selling at 12, 13, 16, 18, 20 cents or even higher. An increase in the price of copper does not necessarily mean that curtailment of use must follow. There are needs which only copper can supply and here it will have to be used irrespective of price. There is also today wider recognition of the merits of the metal, and it is hardly to be supposed that because the price advances, the demand for it will fall off. If one were to consider the use of copper in any finished commodity, I am certain it will be found that the value of the metal figured say at 16c or higher, will have but a small influence on the retail selling price of the article in question. For instance, in an automobile selling around \$1,500, an increase in the price of copper of 5c a pound, should only add about \$3 to the cost of manufacture. In an adding machine selling for \$250, the added cost would amount to about 15c, in an alarm clock selling at \$4, it would add about 10c, and in a \$15,000 house possibly \$10. The sales value of copper and its alloys is firmly established for many purposes and the purchasing public looks for the metal as an indication of quality, and that value is being received. It is hardly to be supposed, therefore, that a few cents difference in the price of the finished article or commodity will deter a prospective purchaser.

From this look into "copper's book" we have seen how the industry has progressed for the last seven years. In 1921 there were large stocks of metal, no production, because it was unprofitable, outlets for the metal had been closed because of the use of substitutes, no new markets were in sight and in fact the entire industry was demoralized. In 1928, after 7 years applying the methods and practices previously mentioned, we find stocks of metal have been reduced to the point where the situation is, if anything, acute; production is 100 per cent of capacity at the end of 1928; many markets that turned to the use of substitutes are now again using copper; many new markets have been developed or are in the process of development. In fact I can say that at this time there is no single cloud in sight that would indicate that there was anything but prosperity in store for the copper industry for some time to come. The very agencies which brought about this prosperity will, if kept going, assure continuous prosperity.

### Pickle for White Gold

Q.—We would greatly appreciate your advising us of a pickling solution suitable for 10 and 14-karat white golds.

A.—The usual pickle to remove fire scale which is composed of 1 part sulphuric acid and 6 parts water is too strong for 10 and 14 karat white gold. Use the following:

Sulphuric acid.....	10 ounces
Sodium bichromate.....	1 ounce
Water .....	1 gallon

Use at temperature of 150° F. After pickling operation, strip in a solution made as follows:

Sodium cyanide.....	8 ounces
Sodium phosphate.....	1 ounce
Rochelle salts.....	2 ounces
Water .....	1 gallon

Use the latter at 180° F. Apply reverse current of 6 to 8 volts. Use copper cathodes.

—OLIVER J. SIZELOVE.

### Meaning of "pH"

Q.—I have been using a comparator in measuring the "pH" of my plating solutions, but not being a chemist, I do not know what this term really means. Can you tell me?

A.—The term "pH" means hydrogen ion concentration. It is just a symbol for the full wording. In using the colorimetric method of measuring hydrogen ion concentration, the results are credited to a certain "pH," and the simplest explanation of this is that the degree of acidity, rather than the total acid content, of a solution is determined. If you will think of the comparator in somewhat the same way that you regard the thermometer, you will understand it better. The thermometer measures the degree of heat in a solution; the comparator measures the degree of acidity, and this is expressed in "pH" just as the thermometer reading is expressed in terms of degrees Fahrenheit or centigrade.

—OLIVER J. SIZELOVE.

# THE METAL INDUSTRY

With Which Are Incorporated

## THE ALUMINUM WORLD, COPPER and BRASS, THE BRASS FOUNDER and FINISHER THE ELECTRO-PLATERS' REVIEW

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# Editorial

## The Aluminum Industry

The Boston News Bureau, a financial journal, recently published a survey of the aluminum situation which was far from glowing. In effect it pointed out that stocks are increasing, new productive capacity is coming in, price cutting has begun, consumption is decreasing, and the importance and possibilities of aluminum have been overrated. The survey added still further that although airships, airplanes, wireless broadcasting, portable typewriters and automobiles have created a great additional demand for aluminum, the growth in aluminum consumption has been disappointing. While aluminum production increased 124,000 tons between 1913 and 1927, zinc increased 351,000 tons, lead 564,000 tons, and copper 602,000 tons.

The color of this picture is so dark as to lead one to wonder if the paints were not mixed beforehand, regardless of what the facts might show. At this moment, the consumption of aluminum may or may not be in a trough, but there is no possibility that the consumption over a reasonable period of time will not continue to increase as it has in the past. New producing units are under construction in Europe and Canada, but they are built for the long pull to take care of future demand which will be greater than ever. A glance over the articles published in *THE METAL INDUSTRY* for March, April and May, 1928, "The Development of the Aluminum Industry," will convince anyone that expansion is still ahead of aluminum, and not behind it.

A comparison of poundage increase with other metals is altogether misleading. Why not take percentages? On this basis, aluminum has increased 141% as against 32% for zinc, 44% for lead, and 56% for copper. The Metal Bulletin of London states that as aluminum has only about one-third the weight of the other principal metals, the volume increase in consumption should be taken into consideration. This effectively complicates the problem so that no conclusions can really be drawn from such figures.

In the absence of definite figures we may admit that consumption for 1927 of aluminum was less perhaps than in 1926. If we had to pass judgment on the general condition of the aluminum industry, it would have to be a snap judgment, due to the absence of up-to-date, detailed and authentic statistics. By no stretch of the imagination, however, can we conceive that the aluminum industry is in a decline. Predictions are unsafe, but between aluminum automobile parts, cooking utensils, household appliances, cable (steel reinforced and all aluminum) and bus bars for the electrical industries, aluminum for steel making, fabricated parts for airplanes and airships, furniture, traction equipment, paints and many others, we can see no possibility except that the aluminum industry points upward.

## The Marine Disaster

The world has been shocked by the appalling fate which overtook the *Vestris*. There have been greater disasters and losses at sea, but none which was so needless, or which could have been prevented more easily.

The best and most authentic testimony probably lies at the bottom of the sea. So far, investigations have resulted in a large mass of more or less contradictory testimony, from which the layman, at least, can gather nothing. All that is apparent is an inexcusable delay in sending calls for help, complete disorganization toward the last, and probably some defective equipment, particularly in the lifeboat tackle.

Whether the ship was fit before she left and what caused her to leak so badly is still not definitely known. There seems, however, to be no mention of defective materials, metals or otherwise. The port holes through which, it is stated, large volumes of water entered, could not be closed, but the reason for this is as yet unknown.

Sometimes disasters of this sort teach us much about materials and design which can be put to good use in later construction. Perhaps certain metal parts failed under stresses or were corroded so as to render them unfit for service. In the *Vestris*, however, no such information has come to the light.

The only bright spot on the horizon is the wireless communication which brought aid, at least, for many of the human lives which were endangered. In this agency, metals played their part. Otherwise, the sinking of the *Vestris* seems to stand out as a useless catastrophe, with a large loss of life which could very well have been prevented.

## Chase Builds in the West

As announced at length elsewhere in this issue and briefly in our last issue, the Chase Brass and Copper Company of Waterbury, Conn., will build a new brass and copper fabricating plant in Cleveland, Ohio. According to this statement, the move was promoted by the need to give adequate service to their Middle Western customers.

This is the first move of any of the large brass companies in Connecticut away from that state, except of course, for the long standing program of the American Brass Company to buy or place mills in other strategic positions. It brings up again the old question about how long Connecticut will continue to lead the country in the manufacture of brass. The most noteworthy point in this step is the fact that the seat of expansion was not in the home plant, but in the vicinity of the customers, who needed their product. Does this mean that the tendency of today is to put the plant near the customer? Of course, the consumer has always been an important factor in the

location of an industry but there are other factors also, such as the location of the raw materials, the supply of labor, transportation facilities, etc. In the case of Connecticut, the brass industry has held its ground in spite of rather than because of many of these factors, and there have been some predictions that eventually Connecticut would lose its brass industry.

Such an extreme shift is certainly not imminent at this time. It may be surmised, however, that expansion in the brass industry in the future will probably be elsewhere than in New England. The public is demanding faster and better service at lower prices. This is obtainable only by locating manufacturing near the consumer, providing the other factors are fairly conveniently placed.

### Copper Progress

The copper consumption of the United States in 1928 should approximate 1,000,000 tons. This estimate, by W. G. Schneider of the Copper and Brass Research Association, is based on domestic deliveries for the first ten months of the year. It is 160,000 tons greater than for 1927. At the same time, although the world production of copper rose to 1,840,000 tons, an increase of 165,000 tons over 1927, the stocks of refined copper on January 1, 1929, will be only 40,000 tons in the United States and 10,000 tons abroad. These stocks amount to only about one-and-one-half weeks' supply, estimating consumption at the same rate as production. The reason for this sharp rise in the price of copper in the last few months is, therefore, obvious—a high rate of consumption and small stocks on hand.

Mr. Schneider predicts that production and consumption will continue on the upgrade until by 1934, the world will require an annual production of approximately 2,240,000 tons. Just how this figure is arrived at is not made clear in his paper read before the New York section of the A. I. M. E. (See this issue, page 522.) Mr. Schneider seems to feel that consumption will follow production, but the history of the copper industry, and for that matter industry in general, hardly bears out such a contention. The reverse is probably the case.

The copper industry is well staffed with sources of information and agencies of aid. The American Bureau of Metal Statistics, the Copper and Brass Research Association, The Copper Exporters, Inc., and Copper Institute, seem to cover every conceivable angle of the field. The statistics on the consumption of copper are undoubtedly available from one of these sources, but the consumers of copper have no information about them. It seems to us that any statistics which are of value to the producers should be made available to consumers for the good of the entire industry. It would prevent misconceptions and mistakes. It would eliminate holding back of purchases to await a lower market and then rushing in to buy when the trend changes, thus bringing on a runaway market.

The producers are just as widely interested as the consumers in getting the price of copper stable at a fair point. The best possible way of accomplishing this end is by

co-operation, and spreading accurate information as fast as it is available. Some of this work is being done at the present time. For example, the Copper and Brass Research Association announces from time to time large purchases of metal or the planning of big construction work calling for heavy tonnages of copper. A unified and organized method of distributing those facts, however, would be better. If a central information bureau were to give out figures of production, consumption, stocks of metal in the hands of both producers and consumers, un-filled orders and the estimated demand, the whole copper industry from mine to stamping shop would be working in the light instead of the dark.

### Work of the Bureau of Standards

The annual report of the director of the Bureau of Standards has been issued for the year ending June 30, 1928, and a review of its work should be of more than ordinary interest to every organization related to metals and metal products. Operating on a budget of about \$2,740,000, the Bureau is undertaking work in all branches of industry. Confining ourselves to the metal industries we find the Bureau has engaged in the following activities.

**Testing.** The Bureau conducts a vast number of tests—454,589 determinations during the fiscal year ending June 30th, 1928, with a fee value of over \$465,000.

**Metallurgical Research.** Tensile and impact properties, resistance to repeated pounding and wear of a series of railroad bearing bronzes; a 400-page circular on aluminum, magnesium, silicon and beryllium.

**Testing Methods for Appraising Corrosion.** Resistance of non-ferrous metals; the development of metal spray processes; thermo-electric properties of pure gold, silver, nickel, iron, aluminum and thorium.

**Industrial Research.** Chromium plating; wear-resisting alloys, such as chromium plate on plug gauges; gases in metals; thermal expansion of beryllium and beryllium alloys; pure nickel, magnesium and magnesium alloys.

**Standardization of Equipment.** General conferences on simplified practice, with additional information on the number of acceptances to simplified practice recommendations; revision and reaffirmation conferences; figures on the adherence to simplified practice recommendations. Commodities in point are terneplate with 100 per cent adherence to simplified practice recommendations and tin ware, galvanized and japanned ware with 92 per cent adherence.

Under the heading of Transferred Funds, appropriations were made for work on airship girders made of Duralumin; strength of flat plates under edgewise compression, made of Duralumin, nickel and Monel metal; prevention of embrittlement of Duralumin by corrosion; electrodeposition of iron.

This is a prosaic recital but it needs no flag-waving or cheers. They would be as out of place as they are unnecessary. It is too clear even from the abbreviated abstract given above that the Bureau of Standards is one of the most vital forces in American industry.

### January Issue Delayed

For the information of our readers who are accustomed to receive **THE METAL INDUSTRY** by about the 10th of each month, it is necessary for us to announce that our issue of January, 1929, will not be in their hands until January 18th or 19th. Our January number is always larger than any other, demanding special work in the compilation of reports, charts and surveys. For this reason more time must be allowed for its preparation.

# Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

ASSOCIATE EDITORS

JESSE L. JONES, Metallurgical  
WILLIAM J. PETTIS, Rolling Mill

W. J. REARDON, Foundry  
P. W. BLAIR, Mechanical

CHARLES H. PROCTOR, Plating Chemical

## Carborundum Powder on Metals

Q.—What is the most satisfactory method for making carborundum powder or emery powder adhere to metals such as cast iron or aluminum?

A.—Horsehide glue is the only method we know to make carborundum powder adhere to metal. This material is used in making up disc wheels for disc grinding. We would suggest, however, that you write the Carborundum Company, at Shawinigan Falls, Que., or the Carborundum Company, at Niagara Falls, Ont. They will be glad to help you and give you the desired information more satisfactorily as they make up discs for grinding, etc.—W. J. R., Problem 3,803.

## Flux for Copper-Lead Alloy

Q.—Would you kindly suggest a flux suitable for preventing segregation of lead in the preparation of copper-lead alloys? The alloy under consideration is the 65:35 copper-lead bearing alloy.

A.—We suggest you use as a flux, for such a mixture 65 copper and 35 lead, galena ore. To prevent separation and segregation one of the best methods is to treat the lead with galena ore by mixing the lead with 2½% galena ore and pour in ingots. Then melt the copper and add the treated lead. Stir well. Make gates on castings small and flat, similar to gates used by iron founders in casting iron. Use no risers.—W. J. R., Problem 3,804.

## Pots for Melting Zinc

Q.—We are contemplating the installation of a welded steel pot for melting zinc for castings, and as we have always used cast iron pots for this work, we are wondering if there would be any reason such as a chemical action between the zinc and steel pot that would deem it inadvisable to change to steel. Our objection to the cast iron pot is its short life, due to the zinc eating its way through the sides or ends of the pot, especially at sand holes or thin places in the pot. We melt our zinc with gas and forced air, and it is brought to about 900 degrees before pouring off. We would greatly appreciate your advice or suggestions regarding this.

A.—There is an alloyed steel that stands up very well in zinc, but the ordinary steel would not last nearly as long as grey iron, due to the chemical action of the zinc on the steel. Cast iron contains graphite and is not as readily attacked by the zinc. We have found that cast iron containing 5% nickel will stand the action better than any other alloy. If you can get a foundry to cast you a pot that will contain 5% nickel you will find a much longer life to the pot. You understand, however, the metal will not help the sand holes or thin spots, but will give a longer life to the melting pot, due to the zinc attacking the iron less.—W. J. R., Problem 3,805.

## Porous Bronze Castings

Q.—We are sending you two small samples of bronze hardware made by us. You will note the polished side is porous. This is made from ingot of approximately 85-5-5-5. It has been analyzed, and so far as the analysis shows there is nothing in it to cause trouble. Can you tell us whether the trouble is in the metal, the sand or the temperature?

A.—On examination of the sample furnished we find the casting very porous. It has the appearance of being caused by the metal; either by pouring too hot or soaking in the furnace; or, it may be in the making of the ingot at the refinery. In any event, the trouble is in the metal.

We suggest that you add 1% more zinc to the metal just before pouring as this will help deoxidize the metal and help eliminate

the gases. Also, we suggest adding a spoonful of common salt to the metal just before taking it from the furnace. Your castings are light and we do not think the trouble is in the molding sand.

You can check your pouring temperature by seeing that the pouring sprue shrinks down when you pour; if too hot, it will rise up in the riser.—W. J. R., Problem 3,806.

## Removing Impurities from Lead

Q.—We wish to know how to melt old lead and get out most of the dirt—not so much the other alloys in it as the dirt. The bulk of dirt will rise to the top, but the lead is used to burn other lead, as in battery work. Fine particles on cinder show red under a flame. It would have to be a simple form of adding something like salts, lime sulphur, soda, etc., as it would not be used to a large extent.

A.—There is no flux you can add to battery lead to reduce the oxide of lead in an open pot. This work must be done in a blast furnace or reverberatory furnace, with proper fluxes composed of iron and soda ash and silica. All you can do in an open kettle is to recover the free lead. This would be done best in a sweating furnace. Such a furnace should be constructed so that as the lead melts it runs away from the oxide and is recovered in a holding pot.

However, if you want to use a kettle, melt the lead and add a small amount of ground rosin and sal ammoniac and skim off the oxide, riddle, and recover the shot metal. Sell the oxide to the smelter.—W. J. R., Problem 3,807.

## Scrap Loss in Casting Brass

Q.—Will you please tell us what would be considered a reasonable proportion of scrap in making small brass and bronze castings in sand molds, not faced? The finished goods must be free from imperfections; as near perfect as possible. The molds are poured upright. The brass averages 68% to 70% of copper and the bronze about 85%.

A.—It is rather difficult to say what the loss should be when we do not know the nature of your work. However, 10% scrap would be, in our estimation and from our experience, very good practice, and 5% on red brass. Some may tell you they do better, but we have not seen them and consider the above figures good practice.—W. J. R., Problem 3,808.

## Smelting Battery Plates

Q.—I am seeking information as to the best possible way to smelt battery plates, both in a reverberatory and in blast furnaces, and wonder if you could help me.

A.—The information we have on the smelting of battery plates is that the work is best done in the blast furnace or a reducing furnace similar to an open-hearth furnace for smelting steel. The flux used is mostly iron scale, and the amount can be determined by a little experimenting.—W. J. R., Problem 3,809.

## Statuary Bronze and Gun Metal Dips

Q.—We are very anxious to secure a formula for a solution whereby we can obtain a statuary bronze or a brownish black finish on brass, without plating, but by emersion.

We would also like to secure a formula for dipping bright cold rolled steel to secure a gun metal finish without plating.

A.—A stationary bronze on brass can be produced in the following solution:

Caustic soda .....	8 ozs.
Golden sulphuret of antimony.....	2 ozs.
Water .....	1 gal.

Use this boiling hot and immerse the work in the solution until a brown color is produced. Scratch brush the work dry. If the color is not deep enough, repeat the operations.

A blue black is produced on steel by immersion in the following solution:

Hypsulphite soda	8 ozs.
Lead acetate	2 ozs.
Water	1 gal.
Use at boiling temperature.—O. J. S., Problem 3810.	

### Tobacco Rose Gold

Q.—We will appreciate your advising us if you know of a process to produce a tobacco rose gold color on brass screws without using a regular gold paint.

A.—Formula for rose gold:

Sodium cyanide	2 ozs.
Potassium carbonate	4 ozs.
Phosphate soda	2 ozs.
Gold (as fulminate)	10 dwt.
Water	1 gal.

Temperature 140° F. Voltage, according to color wanted; a low voltage (1½ to 2 volts) will produce a fine yellow color, while a high voltage, 8 to 10, will produce a brick red color. Experimenting with the voltage will give you proper shade or color desired.—O. J. S., Problem 3,811.

### Tinning Steel Pins

Q.—We are enclosing herewith some plain steel pins. We would highly appreciate your advice as to the best method in which these pins can be tinned without electroplating.

A.—In New England, steel pins have been tin coated by the contact process for the past 75 years, and, as far as we know, this is still the process used there.

For this process, it is necessary to use shallow, iron wire mesh baskets, about 2 by 9 by 18 inches in size, although the dimensions are immaterial. These baskets are lined with perforated sheet zinc to allow a solution to enter and be drained off. A steel tank of suitable dimensions should be arranged with steam coils made of iron or steel so that the solution can be kept at 180 to 200° Fahrenheit. It should be large enough to hold several of the baskets at once. The arrangement can be worked out to suit the scale upon which the work is to be done.

The pins to be tinned should be placed in the baskets to a depth of 1 to 1½ inches. The pins should be clean and free from rust; they should preferably be tumbled as bright as possible.

The tinning solution consists of the following materials and must be constantly replenished if it is to produce a uniform tin deposit constantly:

Water	1 gallon
Tin chloride	½ oz.
Ammonia alum	¼ oz.
Cream of tartar	½ oz.

Dissolve the materials in one-third of the water at first, at 200° F., then add to the water to make up the number of gallons required. For replenishing purposes, prepare a concentrated solution on the above basis and add a definite quantity by fluid measure to the original solution to maintain the original strength. It requires from 30 to 60 minutes to obtain a good coating. You can determine the time by watching your results.

After tinning and drying out, the pins should be polished to a good lustre by tumbling in a mixture of about two parts maple wood sawdust and one part wheat bran with a very small amount of air floated gilders' whiting or precipitated carbonate of lime as a polishing medium in the sawdust and bran mixture.

In the midwest the manufacturers of iron pins copper coat them by immersion in a solution of copper sulphate. The Germans have gone the Americans one better. They now brass plate the pins with a fairly good deposit of brass and then tin them by immersion in this solution:

Water	1 gallon
Tin chloride	2 ozs.
Caustic potash	4 ozs.
Sodium Cyanide, 96-98%	3 ozs.
Temperature, 180° F.	

The solution is prepared by mixing in the order given, using only a part of the water at first. The solution is contained in an iron tank. Wire mesh baskets of iron are used, lined with sheets of pure tin about ½ inch thick. The sheets are perforated. Tinning takes place in a very few minutes and the pins are then tumbled as outlined above.

A coppering solution for steel pins is the following:

Water	1 gallon
Sulphuric acid, 60°	8 ozs.
Copper carbonate, dry	4 ozs.

The copper carbonate should be added very slowly, with constant stirring, until it is dissolved. Use brass wire baskets or regular stoneware dipping baskets for this purpose. The pins themselves are the reducing factor for the copper in solution. For brass coating the following solution can be used:

Water	1 gallon
Copper sulphate	1½ ozs.
Tin chloride	1½ ozs.
Sulphuric acid, 60°	1½ ozs.

The procedure is the same as for copper coating. Immersion for only a moment or two is all that is necessary.—C. H. P., Problem 3,812.

### Protecting Food Products

Q.—One of our customers is about to install 50 ft. of 2-inch brass pipe and 30 fittings, and will run hot tomato ketchup through it. He wishes us to silver plate this material inside. Could you advise us if this would be the best kind of coating for this work?

A.—Either silver or tin deposit will answer the purpose. Tomatoes are contained in tin cans. The product is placed therein uncooked and the cans are then placed in boiling water or steam cookers. The acid of the tomatoes apparently does not act upon tin.

In cooking fruit, jelly, etc., both silver and tinned copper utensils are used. For an electro-tin plating solution, the following formula can be used to advantage:

Water	1 gallon
Sodium stannate	24 ozs.
Caustic soda, 76%	4 ozs.
Powdered yellow rosin	½ oz.

Temperature of solution should be 180° F. Plate at 2 to 3 volts. Either steel or tin anodes may be used.—C. H. P., Problem 3,813.

### Linseed Oil Soft Soap

Q.—Kindly furnish us with formula for making linseed oil soft soap for burnishing steel.

A.—We believe it would be cheaper to purchase a linseed oil soap than trying to prepare it yourself. It requires experience to make a good soap. However, you can prepare a linseed oil soap that will answer your purpose as follows:

Water	4½ gallons
Granular caustic soda, 73-76%	10 lbs.

Dissolve in a clean wooden barrel or earthenware jar. Use cold water and add the caustic soda very slowly, with constant stirring. When completely dissolved, allow to cool to normal temperature.

Weigh out 75 lbs. of linseed oil and pour the caustic soda solution slowly into the oil, constantly stirring the mixture with a flat wooden paddle until they are thoroughly combined and look like honey.

Do not stir too long or the mixture will separate out. When the mixing is complete, pour off the liquid soap into a wooden box of suitable size to act as a mold. Dampen the inside of the box with water so that the soap when cool will not adhere.

Put the box in a warm place and cover it, too exclude dust, with a cover of cloth. In 24 hours the box will contain a solid block of soap; cut it up with a steel wire. For successful results the instructions given must be strictly adhered to. Experiment with small portions first to gain the necessary experience.—C. H. P., Problem 3,814.

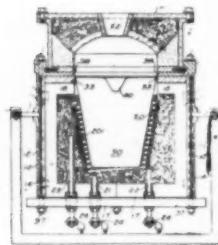
# Patents

## A REVIEW OF CURRENT PATENTS OF INTEREST

1,681,904. August 21, 1928. **Welding Rod.** Pliny P. Pipes, Mansfield, Ohio, assignor to The Ohio Brass Company, Mansfield, Ohio.

A copper welding rod containing phosphorus between the limits of about 0.10 per cent and 0.20 per cent and tin between the limits of about 0.50 per cent and 1.00 per cent.

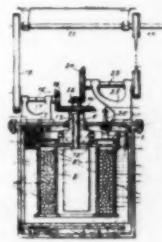
1,682,388. August 28, 1928. **Induction Furnace.** Rollo B. Lincoln, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company.



In an induction furnace, the combination with a helically wound inductor coil and a crucible nested therein, of a metallic casing surrounding said coil and crucible, and ferromagnetic means within said casing in the exterior flux path of said coil for preventing the induction of electric currents in said metallic casing.

1,682,426. August 28, 1928. **Apparatus for Producing Sheets and Similar Articles Electrolytically.** Johann Carl Friedrich Albert Schütte, Altdorf, Switzerland.

An apparatus for producing sheets and similar articles electrolytically, the combination with a casing of any suitable form, serving as cathode, means for stirring the electrolyte and arranged in said casing, an anode-casing containing the ore or the other material to be treated electrolytically, said anode-casing surrounding the stirring means and having perforations through which the electrolyte acting on the ore or the like is forced by said agitating means, and means for actuating said agitating means.



1,683,749. September 11, 1928. **Alloy.** Sewell E. Winslow, Bridgeport, Conn., assignor, by mesne assignments, to Consolidated Ashcroft Hancock Company, New York, N. Y.

An alloy or composition of metals, composed substantially of nickel, copper and tin, the nickel and copper in approximately the atomic proportions of ten to four and tin in an atomic proportion not greater than one.

1,684,131. September 11, 1928. **Alloy.** Russell Franks, Elmhurst and Burnham E. Field, Douglaston, N. Y., assignors to Haynes Stellite Company, a Corporation of Indiana.

An alloy containing from 3 to 5% aluminum, 3.5 to 6% silicon, 5 to 12% tungsten, 6 to 12% titanium, boron in substantial and effective amounts up to 1%, the balance being principally nickel.

1,684,504. September 18, 1928. **Submerged-Channel Induction Furnace.** Edwin F. Northrup, Princeton, N. J., assignor, to the Ajax Metal Company, Philadelphia, Pa.

In an electric induction furnace of the submerged resistor type, a channel resistor unsymmetrical on opposite sides of the secondary having two end connections with the furnace staggered laterally of the winding, a transformer core threading the resistor and a transformer winding upon the core, the current in which exerts different pressures upon the two branches of the resistor at the same heights thereof and causes flow by reason of the lack of symmetry of the secondary.

1,684,565. September 18, 1928. **Coated Metallic Articles Such as Stereotypic Plates and Method of Producing Same.** Colby Charles Waller, New York, N. Y.

The method of producing a copper coating upon a stereotypic plate which includes impregnating a fibrous blank with an emulsion containing copper sulphate, hydrous aluminum silicate, boiling water and powdered gum arabic, impressing

said matrix with the desired characters at a temperature approximating 240° F., casting molten type metal against said matrix, removing casting and cleaning the surface thereof.

1,684,696. September 18, 1928. **Alloy and Process of Making the Same.** Alexander L. Feild, New York, N. Y., assignor to Electro Metallurgical Company, a Corporation of West Virginia.

The herein-described process of combining zirconium with copper which consists in introducing an alloy of aluminum and zirconium into a superheated bath of copper.

1,685,553. September 25, 1928. **Sand Mold for Casting Magnesium and process of Making Same.** Gilbert Michel, Bagnoux, France, assignor to Hart O. Berg, Paris, France.

A process for the preparation of a mold for casting easily oxidizable metals which comprises preparing a molding sand by incorporating in it rosin dissolved in a non-aqueous oily liquid and naphthalene, and forming the mold from the said sand mixture.

1,685,570. September 25, 1928. **Process of Improving the Qualities of Nickel-Beryllium Alloy.** Georg Masing, Berlin, and Otto Dahl, Berlin-Charlottenburg, Germany, assignors to Siemens & Halske, Aktiengesellschaft, Siemensstadt, near Berlin, Germany.

A method for improving the qualities of nickel beryllium alloys which contain large proportions of nickel and up to 5% beryllium, consisting in heating the alloys to a temperature above 700° C., after cooling, and afterwards working them mechanically.

1,685,653. September 25, 1928. **Magnesium Alloy and Method of Making Same.** William R. Veazey, Cleveland Heights, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

As a new product, an alloy of magnesium with from one-hundredths to one-tenth of one per cent of chromium.

1,685,975. October 2, 1928. **Alloy.** George H. Bender, Detroit, Mich.

An alloy consisting in substantially the proportions herein set out, of—

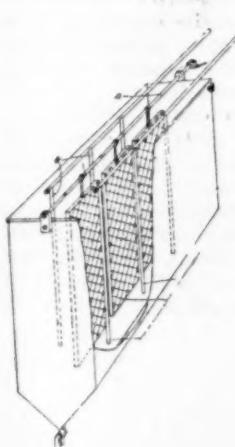
	Parts.
Copper .....	70 3/10
Tin .....	24 53/100
Lead .....	5 2/10

1,686,277. October 2, 1928. **Metallic Composition and Process for Making the Same.** Wilbur H. Judy, Buffalo, N. Y., assignor to Sumet Corporation, Buffalo, N. Y.

The method of purifying lead which consists in introducing hydrogen to the exclusion of oxygen into the mass of metal when such metal is in a molten condition.

1,687,056. October 9, 1928. **Process of Electrolytically Separating the Alloys of Silver With Other Precious or Base Metals.** Rudolph Carl, Vienna, Austria.

In a process of electrolytically separating the alloys of silver with other precious and base metals, the step consisting in employing these alloys as anode in a neutral electrolyte whose anion is able to form with the silver and the base metals of the alloy easily soluble salts, whereby hydroxylions are released at the anode and form oxides of the precious metals and hydroxides of the base metals, the hydrogen released at the cathode reducing the silver oxide to a finely distributed silver which does not adhere to the cathode.



# Equipment

## NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

### Bronze for Decorative Forgings

Until a recent development, the greater part of all hand forged metal work used for architectural ornamentation was made of iron. When a richer, more durable material was required, commercial bronze was occasionally used, but this had its limitations. It displayed a tendency to crack when reduced to very thin sections for delicate ornament or repoussé work.

The American Brass Company, Waterbury, Conn., has developed a material which has caused a considerable change in this situation. "Anaconda Forging Bronze" was produced at the request of a customer who produces ornamental metal work and who had found that certain European concerns were using a special bronze for this work. Formerly the customer had been using a special grade of Swedish iron. Samples of the bronzes used in Europe were obtained by the customer, according to the company, and the latter was asked to duplicate it, which he did. It resulted in a new material suitable for hot forging. The accompanying illustration demonstrates the intricate, artistic designs that are possible with the material.

In regard to this metal, The American Brass Company states that from the lowest perceptible red heat through many temperatures in 2 inches, to makers claim. When bright dipped, the material closely resembles 10 carat gold in color, it is stated.

FORGED BRONZE GATES

to an extremely bright red, "Anaconda Forging Bronze" was found to forge well. Tests, however, indicated that forging with a dull red heat gives the most satisfactory results.

This bronze is furnished in two grades—that known as first grade will give a tensile strength in the neighborhood of 60,000 pounds per square inch and an elongation of approximately 35% in 2 inches, to makers claim. When bright dipped, the material closely resembles 10 carat gold in color, it is stated.

Wrought iron has a somber appearance and requires frequent coats of paint to prevent rusting. "Anaconda Forging Bronze" can be worked as easily as iron and forged into intricate and delicate geometric or floral designs and is especially useful where decorated sections are designed too thin to permit of casting, the producers say. Although its price is higher than iron, its non-corrosive properties, durability and freedom from high maintenance costs, as well as the superior beauty, richness and dignity of the metal, will fully compensate for the difference in cost.

At the present time Spanish architecture, which depends largely upon forged metal work for decorating features, is very popular and this trend in style has increased the demand for hand-forged metal work. In addition to architectural designs, where the bronze is said to be suitable for window grilles, balconies, railings, gates, enclosures, etc., it also has possibilities for the fabrication of wall sconces, lighting fixtures, door hardware, weather vanes, metal signs, bridge and floor lamps, fireplace sets, etc., it is stated.

Before The American Brass Company produced these special bronzes, it was the opinion of the trade generally that it was impossible to forge bronze into thin or delicate designs, but with a metal which works hot under the hammer as readily as iron, manufacturers of forged work are recommending bronze, and its use is being considered for large estates and public buildings where the owners are willing to pay for the best material.



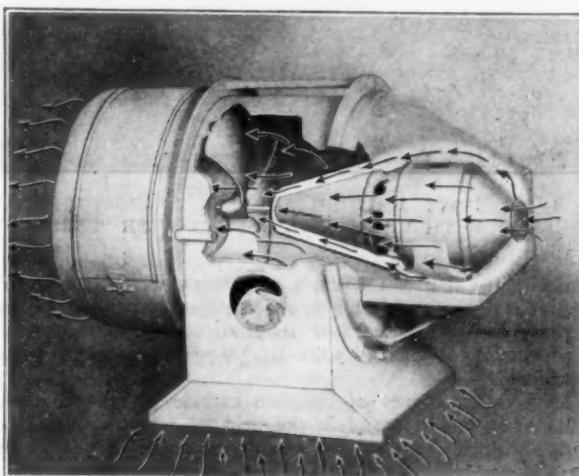
### Acid-Resisting Bricks

A brick designed to resist acids has been placed on the market by the General Refractories Company, Philadelphia, Pa. According to the manufacturers, this brick is impervious to dilute or concentrated acids, including sulphuric. The brick is known as "Acido." It is made from specially selected clays, it is stated, which are treated to produce a dense, impervious body which is thoroughly acid-resistant. The bricks are stated to be uniform in quality, size and shape. They are made in standard 9-inch sizes and all standard shapes, and are shipped from the company's plants either at Beech Creek, Pa., or Hitchins, Ky., according to customers' preferences.

The bricks are stated to be used extensively in plants where acids are handled, including copper, lead and zinc plants producing acids as by-products, paper mills, in Glover and Gay-Lussac towers at sulphuric acid plants, for contact with hot gases and strong sulphuric acid. The bricks are said to be very useful in construction of acid storage facilities and for parts of equipment which come in contact with acids.

### Ventilating Unit for Spray Cabinets

The Paasche Airbrush Company, Chicago, Ill., has recently introduced a new type of ventilating unit for spraying rooms and cabinets. This equipment, it is claimed, has a number of special features, chief of which is its ability to prevent fires and explosions, due to the fact that it draws a very large volume of air at low operating cost. The machine has a universal mounting and housing which makes for convenience in erecting. The machine is adjustable for four mounting positions, and the outlet may thus be placed wherever the user desires. The unit is provided with special Westinghouse motor which is placed in a position that keeps it out of the path of fumes and makes for safety, the makers state. Screened air is drawn over the motor to keep it



NEW VENTILATING UNIT

cool and to prevent any possible combustion that might occur. The machine as a whole, it is claimed, not only conforms to fire laws, but even exceeds the precautions which the laws demand.

The fan of this unit consists of a three-blade aluminum propeller which is easily removable for cleaning. The unit is made in the following sizes: 110-220 volt, a. c., 1 phase; 220-440 volt, 3 phase, a. c.; 110 or 220 volt, d. c. Motors are made in quarter, half, one or two horsepower sizes, as desired, to displace volumes of air ranging from 2,700 cu. ft. per minute, up to 16,000 cu. ft. per minute.

## New Tool Material Developed by General Electric Company

Cutting a screw thread in a glass rod, boring a smooth hole in a block of concrete, handling porcelain on a lathe, and cutting the hardest of steels—things difficult or even impossible with present-day machine tools—are among the things that can be done easily with a new kind of machine tool material announced by Dr. Samuel L. Hoyt, of the Research Laboratory of the General Electric Company, at the annual convention of the American Society for Steel Treating, at Philadelphia on October 11. The new material, named "Carboloy," is composed of tungsten carbide and cobalt, the carbide being extremely hard and the cobalt giving it the necessary strength for cutting tools. A new firm known as the Carboloy Company, Inc., which will handle the material commercially. Offices of Carboloy Company, Inc., has been established at 1 River Road, Schenectady, and at 350 Madison Avenue, New York; inquiries are to be handled from the New York address.

The possibilities of the new tool material were indicated by Dr. Hoyt in his references to experiments conducted with molded materials containing metal inserts, such as fabric gears used in

diamond drill or a "star" hammer, which really breaks its way roughly through the concrete. A drill made with the new cutting material has advantages over both of its predecessors, in that it is less expensive than the diamond drill and that it cuts a smoother hole than does the "star" hammer drill.

Hadfield's manganese steel, previously in the non-machinable class of metals, was found to yield so easily to the new cutter that commercial operation is expected to be developed. Similarly, in the General Electric research laboratory it has been found that numerous experimental alloys can be handled by tungsten carbide cutters, although not with the usual tools. It was found that even a block of quenched high-speed steel could be machined on the shaper with the new material, although with difficulty, and that the same held true with the super-high speed cobalt-chromium alloys.

In testing high-speed steel it is customary to use a nickel-steel test log, operating at about 50 feet per minute. Because of the lack of effect on the new cutter, however, it was necessary to increase the speed to 200 feet per minute. At this higher speed a high-speed steel cutter failed in 16 seconds, with its edge burned off. The tungsten carbide tool, operated under identical conditions, was run for an hour before the test was arbitrarily stopped, and the tool was still cutting and capable of cutting for a much longer period of time. In another run with a test log of chromium-nickel steel, with a cut of  $\frac{3}{8}$ -inch and a feed of  $\frac{1}{8}$ -inch, good high-speed tools failed in from six to eight minutes when operated at 35 feet per minute; Carboloy tools, with the same cut and feed but at 70 feet per minute, twice the speed, showed but little wear after 10 minutes.

One difficulty with today's tools has been that wear of the tool causes a taper. In machining a hollow cylinder of carbon, for instance, the best tool steel loses its cutting edge and begins cutting a taper soon after starting; tungsten carbide tools take an entire cut without tool wear, and hence without tapering.

Genelite, composed of copper, tin and carbon, is so soft it can be whittled easily with a knife, but it is also so abrasive that it dulls a steel tool almost at once. A cut on a small cylinder of only a few inches in length has always been on a taper; here again the tungsten carbide tools have not been worn, and hence the cuts are not tapered.

The bearing surfaces of commutators of electric motors, of alternate layers of mica and copper, have always presented a problem since they must be accurately machined and since mica is very abrasive. Here also the new material gives a smooth finish without undue wear.

Molded compounds such as Bakelite and hard rubber also wear tools quickly. Diamond tools are used with Bakelite since the



FIG. 1—DR. HOYT HOLDING SAMPLES OF PORCELAIN AND BAKELITE WITH METAL INSERTS, CUT WITH "CARBOLOY"

automobiles. Cobalt-chromium alloy cutters, which had given the best previous service in this work, required redressing for every 150 parts machined; the new tungsten carbide tools, operating under identical conditions, finished 11,000 parts before they required sharpening.

"The peculiar virtues of tungsten carbide promise to make it the dominant tool material in the field of weak or 'low tensile' materials, which are also uncommonly abrasive to present tools. Here the durability of Carboloy tools has been found to be of the order of 25 to 75 times that of high speed tools," Dr. Hoyt said. "The new material can machine harder and denser grades of steel than can be handled economically by high-speed steel; and steels with higher alloy contents than are now commercially machinable will be brought into the machinable class." Some of the other unusual properties claimed are as follows:

Usual cutting tools will not affect a glass rod; instead, a rod of glass in a lathe will wear off the edge of a cutting tool that is pressed against it. The tungsten carbide tool quickly cuts into the glass, and can even be used for cutting a screw thread into the rod. Likewise, hard porcelain insulators can be machined on a shaper with the new material. For drilling a hole in concrete and rock it previously was necessary to use either an expensive

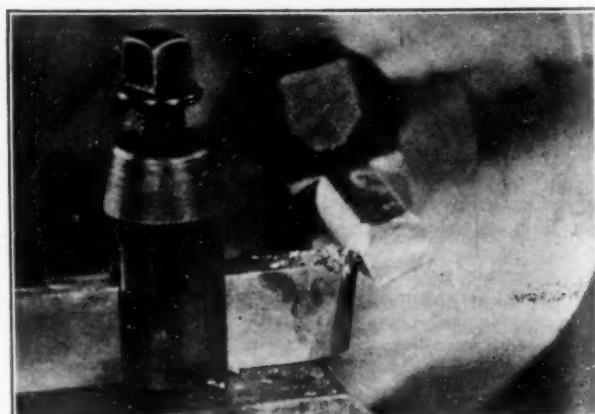


FIG. 2—CUTTING A HIGH SPEED STEEL CUTTER IN A LATHE WITH "CARBOLOY"

previous stones have been the only material to stand up at the high cutting speeds used. If the Bakelite contained a metal insert, however, a special operation was needed since the diamond would be broken if it struck the metal at high speed. With Carboloy no special operation is required.

When considering cast iron, cutting conditions are found to be much different. The parts are frequently large, the cutting speeds are lower, the cuts are heavier, and the tool pressures greater. One of the most difficult jobs with cast iron has been the removal of the surface layer of chilled metal, particularly if the surface contains sand. The chilled iron and sand are harder than tool steel, so that the edge of the cutter is taken off almost at once. Tungsten carbide, however, is harder than the surface of the cast iron, so that it can handle work of this kind without difficulty. In fact, the same speeds and feeds can generally be used for the surface as for the sub-surface cuts.

Hard castings can be handled as easily as soft ones with the new material; and intermittent cuts are also handled satisfactorily, it is stated.

#### PHYSICAL PROPERTIES

The windows in the laboratory rooms bear witness to the extreme hardness of the new cutting material—deep scratches have been made in the glass, just as though a diamond had been used. Natural sapphire, next below diamond in the scale of hardness, is also scratched by the tungsten carbide, the makers state. If Carboloy is held against the side of an emery grinding wheel, a deep, narrow groove is worn in the stone, without the Carboloy suffering much loss, whereas ordinary tool materials are worn away.

When it came to determining quantitatively the hardness of the new cutter, it was found that the usual method of using the Rockwell test was not of service—the point of the diamond wore and crumbled in too short a time if the diamond penetrator was loaded with a weight. It was necessary to use the penetrator without a load.

The test showed that common hardened tool steel has an average maximum hardness of 850 on the Brinell scale, that the hardest steel may be taken as about 1,000, and that the hardness of Carboloy runs 2,000 and above.

The addition of cobalt to the tungsten carbide increases its strength to more than half that of high-speed steel. Tungsten carbide without cobalt has a strength of less than 50,000 pounds per square inch, Carboloy up to 275,000 pounds, and quenched and tempered high-speed steel 425,000 pounds.

Another important property of a cutter is toughness, and the new material will withstand quite severe blows of a soft peen on the edge of a bar. A supporting block of copper shows marked

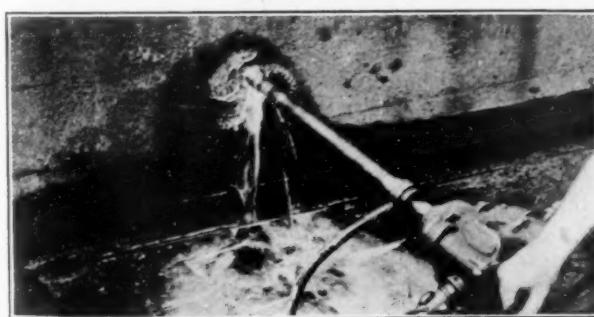


FIG. 3—USING THE "CARBOLOY" CONCRETE DRILL

indentations as a result of the blows on the edge of the material, but the edge does not crumble. The strength and toughness of the material are further shown by its ability to take intermittent cuts on metals.

The tungsten carbide material does not pit or tarnish, and is dissolved in acids only with great difficulty. The moderate temperatures involved in cutting metals at the speeds generally used have not been observed to be harmful; but, if the speed is raised too high and the abrasion is severe, small particles of carbide may oxidize and shoot off from the edge as sparks. Ordinarily the temperatures involved simply produce temper colors, much the same as they do with high-speed steel.

The material retains its strength and hardness at elevated temperatures to a remarkable degree. Tools have been observed cutting nickel steel when the point of the tool was at a bright red heat, without showing any ill effects. The material has no "temper" to be "drawn" by the heat generated, and it is actually much harder than the materials machined, even at elevated temperatures.

#### Portable Grinder and Buffer

A new type of portable grinding and buffing machine, electrically operated, with ball bearing motor and roller bearing grinding spindle, has been placed on the market by The Hisey-Wolf Machine Company, Cincinnati, Ohio, manufacturers of a wide variety of portable electric machine tools. The new product has a number of features which the company outlines as follows:

The new, one-half horsepower grinder, known as type 3GA (alternating current), and 3GD (direct current) is made with a new two-pole



PORTABLE GRINDER AND BUFFER

switch which has been approved by the underwriters and which is conveniently controlled at the grip handle. For single phase service, an improved commutating type of repulsion-induction motor is standard, while for two and three phase operation, the machine is equipped with a rugged squirrel-cage motor. For direct current service the machine is made with a specially designed compound-wound motor. There is a cast steel wheel guard which is adjustable at any angle, designed to conform with A. E. S. C. standards. The end cover is readily removable for renewal of grinding wheels. The alternating current machines are made with the following specifications: 60 cycle, continuous duty, either 110 volts, one phase, or 220 volts, one or three phase; one-half horsepower, 3,425 revolutions per minute with wheel 6 by 1 1/4 inches, with 3/4-inch hole; net weight, 42 pounds with guard, 38 pounds without. The direct current machine is made in 115 or 230 volts, one-half horsepower; 3,550 revolutions per minute.

#### Fast Copper Plating Process

The Dallas Brass and Copper Company of Chicago, Ill., reports a fast-growing new market for copper has been developed by one of its customers, the Standard Process Corporation, 360 North Michigan Avenue, Chicago. This concern, with branch offices in New York and San Francisco, has among other processes covering the mechanics of intaglio printing, a fast copper plating method for copper rollers which the rotogravure industry of the United States is taking to with great rapidity. This process is now operating in twelve of the leading rotogravure plants of this country, and they expect to have the process installed in every gravure plant in the United States and Canada within the next twelve months, it is stated.

For this process the printing cylinders are first brought to the desired standard diameter. This diameter is maintained continuously thereafter, for the reason that a very fast plating of sufficient depth for one etching is deposited upon the smooth surface of the base copper. The surface of this shell, or single etched plating, is so fine that it requires but a little hand polishing to make it ready for the etching room. When these cylinders come off the press, this etched shell is readily stripped from the base copper, and the cylinder is again ready for the plating tank. A sufficient plating for one etching (.005 in.) is deposited in one hour by their fast plating method, and within a half hour thereafter the cylinder is ready for the etcher, it is claimed.

Uniform diameter of cylinders and the finest structure of copper, which greatly increases production from one set of cylinders and the speed with which the whole operation is done, will make this process a boon to all intaglio printers, it is said.

#### Die-Cast Cases for Control Instruments

A rapidly growing practice in the assembly of metal products today is the use of die castings for parts formerly cast or machined. In this development much work has been done by The Brown Instrument Company, Philadelphia, Pa., makers of indicating, recording and automatic control instruments for checking industrial and power plant process operations. During the past several years this company has almost entirely swung over from using cast iron instrument cases to the use of aluminum die castings for the cases and cover bezels of practically all models of its instruments.

A number of the die-castings required presented problems of extreme difficulty. The aluminum cases now standard for all Brown continuous chart recorders, for example, are said to be among the largest aluminum die castings ever produced on a quantity basis. These cases are 15 by 13 by 7 inches.

Die-cast aluminum cases cost substantially more than cast-iron cases, if the cost of the cases only is considered. But this difference in first cost is largely overcome by the savings effected by the perfection of detail assured by the die-casting process, which greatly reduces the grinding and machining, so necessary with iron castings, it is stated. Also, flaws in good die-castings are comparatively rare.

This change to die-cast aluminum cases is said to assure instrument cases that are closely uniform in dimensions and quality, resistant to corrosion, free from flaws, economical of freight and express charges and easy to handle in installation.

### Words Sent by Telephotograph

A new method of communication has recently come into use. The device itself is not new. It is the telephotograph, more or less familiar to newspaper readers. This device, however, has found a new application which gives promise of furnishing a large capacity channel of communication that will quickly and accurately distribute information "in bulk" over any desired area, however extensive, according to the American Telephone and

Telegraph Company, New York. Instead of reproducing pictures of persons, objects and events only, the telephotograph now reproduces pictures of long letters, statements and the like.

Recently a large manufacturing company wished to send out from its New York office to 21 division offices scattered across the continent a letter introducing a new item. The letter of the company, containing 391 words, was photographed on a film 5 by 7½ inches and within an hour facsimile photographs were delivered in all division offices in telephotograph cities. From the telephotograph stations additional copies of the photographed letter were sent by special delivery or air mail to division offices in nearby cities, and within 24 hours every office had the information.

The significant feature of the telephotograph as a method of distribution is the reproduction of the subject in facsimile at distant points; not only the company's letterhead and message but the signature of the writer, just as they appeared in the original. The photographic process permits the addition of any illustrations such as diagrams or drawings of new designs. In this new role the telephotograph has already come into extensive use among organizations manufacturing automobiles or accessories. The Ford Motor Car Company employed it to distribute photographs and advertising copy on its new model and the new Cadillacs and Chryslers were also shown to the country by this means. The Studebaker Corporation was the first company to use the service for such purposes, transmitting pictures of its new car.

## Equipment and Supply Catalogs

**Belt Conveyor Idlers.** Chicago Automatic Conveyor Company, Cicero, Ill.

**Automatic Control of Acid Baths.** Leeds and Northrup Company, Philadelphia, Pa.

**Stow Flexible Shaft Machines.** The Stow Manufacturing Company, Inc., Binghamton, N. Y.

**Sirocco Unit Heaters.** American Blower Corporation, Detroit, Mich. The latest addition to the list of this company's products. Interesting illustrated catalog.

**Hocut.** E. F. Houghton and Company, Philadelphia, Pa. Transparent, water-soluble metal cutting coolant. Also, Houghto-Clean, a line of cleaners for general industrial use.

**Nickoware.** Koeppen Metal Products, Inc., Karlstadt, N. J. Pure nickel kitchen utensils; knife cleaning and polishing machines.

**Why Blaze a Trail Along a Beaten Path?** The Cutler-Hammer Manufacturing Company, Milwaukee, Wis. Pamphlet on motor control problems.

**Business Organization.** Policyholders Service Bureau, Metropolitan Life Insurance Company New York City. No. 12, "Functions of the Production Executive." A very interesting study.

**Fluid-Compressed Products.** The Paper and Textile Machinery Company, Sandusky, Ohio. Tubing, casings, liners, cylinders, sleeves and rolls in brass, bronze, nickel, copper, aluminum etc.

**Lava Super-Refractories.** Lava Crucible Company of Pittsburgh, Pa. Technical catalog of brick, tile, special shapes, plastics, cements, etc. Also, **Lava Crucible Furnace Linings.**

**Stewart Furnaces and Modern Flying.** Chicago Flexible Shaft Company, Chicago, Ill. Hardening, heat-treating, forging, enameling, carburizing furnaces and ovens, etc. Also, **It's the Only Way;** same subject.

**The Use of Style and Design in Industry.** Policyholders Service Bureau, Metropolitan Life Insurance Company, New York City. A very interesting survey of the trend toward new style and design in many products of industry.

**The Handbook of Johnson Direct Jet Gas Appliances.** Johnson Gas Appliance Company, Cedar Rapids, Iowa. A complete catalog of gas burning equipment in great variety, including Bunsen jets, jets mounted on cores, jet regulators, urn burners, drilled pipe burners, gas mixers, torches, melting pots, soldering furnaces, melting furnaces, heat-treating apparatus, and all kinds of gas repair parts.

**Ideal Industrial Machinery.** Ideal Industrial Machinery Division of Consolidated C. M. Corporation, Winton Place, Cincinnati, Ohio. A fine catalog of devices for tumbling, separating, cleaning, washing, burnishing, painting and pickling of metal parts. Thirty-one beautifully printed pages of descriptions of the company's products and a full explanation of the service the company offers to users of its machinery.

## Associations and Societies

### REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

#### American Foundrymen's Association

HEADQUARTERS, 222 WEST ADAMS STREET, CHICAGO, ILL.

#### International Foundrymen's Congress

The Third International Foundrymen's Congress will be held at London, England, during the week of June 9, 1929, under the auspices of the Institute of British Foundrymen. The latter organization has extended a cordial invitation to American foundrymen to attend the congress, and the American Foundrymen's Association has arranged several tours for its members, with itineraries which include the congress and also considerable European sightseeing, plant visitation and other events. One of these tours starts May 10, and another May 15, these being longer tours for those who have more time to spend in travel. Two

other tours have been arranged for those who wish to leave later, one leaving on May 31 and the other on June 1. Departure in all cases is from New York, on the dates given. Cunard and White Star liners are to be used, and the tours are in charge of the Association's Committee on International Relations, in conjunction with Thomas Cook and Son, New York. A comprehensive booklet giving full information on these tours and on other matters relating to the congress has been prepared and may be had by addressing C. E. Hoyt, Executive Secretary, American Foundrymen's Association, 222 West Adams Street, Chicago, Ill. It is known as Booklet No. 7. It is requested that reservations be made at once, or as early as possible.

## American Electroplaters' Society

### Detroit Convention Plans

DETROIT HEADQUARTERS, CARE OF T. C. EICHSTAEDT, 654 MOUNT ELLIOT STREET, DETROIT, MICH.

As previously announced, the 1929 annual convention of the American Electroplaters' Society will be held in Detroit, Mich., July 8 to July 11. Already electroplaters in all centers of the industry are making definite plans for the event, which, it is declared, will exceed anything ever before undertaken by the organization.

For the past month or so members of the Detroit branch have been meeting, naming committees and otherwise organizing in order to get the convention machinery in order.

On Friday, November 2, Dr. W. S. Blum, of the United States Bureau of Standards, came on to Detroit and gave a highly absorbing lecture on chromium plating, outlining the results of experimental work done to date. From the informal discussion that followed it is apparent that chromium plating will be one of the program features at the convention next Summer. Dr. Blum announced that he was doubly pleased to come to Detroit for this meeting because he desired to make another inspection of plating plants here in his search for new facts, particularly regarding chromium. "Detroit is such an enormous plating center," he said, "and so many new features are being developed here to the advantage of commercial chromium plating, that it is an inspiration to visit the plants as often as possible."

The fact that Detroit is such an expanding plating center adds to the city's attractiveness as a place for the convention. "And then," jovially added E. V. Allen, president of the local organization, "we are just as good entertainers as we are platers." And what Mr. Allen says is true. Every one realizes that the Detroit platers know their stuff, for the American Electroplaters' Society tried out their hospitality two years ago and also a decade before that. Supporting Mr. Allen, president of the branch, are Charles Mascola, vice-president, and Charles Phillips, secretary and treasurer. But these are not the only active ones. There is T. C. Eichstaedt, chairman of the committee dealing with general information, reception and registration. Supporting him are John Schultz, of the Eureka Vacuum Cleaner Company; J. C. Robinson, who is in business under his own name; W. T. Patterson, of the Ford Motor Company; Art Sutcliffe, of the Motor Products Corporation; A. E. Shepard, Sr.; Al. Barrows, of Jackson, Mich., and R. E. Miller.

Then there are H. E. Wagner, chairman of the program committee; H. J. Jameson, of the Detroit Testing Laboratory, chairman of the educational committee; E. G. Lovering, general committee chairman; Charles Marker, chairman of exhibits; William W. McCord, chairman of the entertainment committee, and B. F. Lewis. All of the foregoing are prominently engaged in the plating business, some for themselves, others with big corporations. They are out to make the next July convention a big event. The keynote of the whole affair will be educational. Of course, there will be interesting social features also; that is to be expected, but they will be subordinated to the real aim of the gathering.

Just before the November 2 meeting of the Branch came to a close, the following announcement was made:

"The 1929 convention of the American Electroplaters' Society, scheduled for July 8 to 11, at Detroit, is to include many innovations calculated to attract the interest of those connected with the industry. Technical papers will be grouped together under general subjects and presented in symposium form. These papers are being prepared by specialists within the Society membership, and also by leading research workers."

"An exposition of unusually fine electroplated products is being arranged to take the place of the customary equipment exhibits."

"Detroit, known as the 'Convention City,' has everything that contributes to the pleasure of guests, and the members and friends of the American Electroplaters' Society are assured of a highly enjoyable and educational visit in Detroit next July."—F. J. H.

### Chicago Branch

HEADQUARTERS, CARE OF S. J. C. TRAPP, 1127 NORTH SEVENTH STREET, MAYWOOD, ILL.

#### ANNUAL BANQUET IN JANUARY

The Chicago Branch of the American Electroplaters' Society has set the date for its next annual banquet and educational

session for Saturday, January 26, 1929. It will take place at the Hotel Sherman. The Louis XVI room has been taken and the educational session will start promptly at 2 p.m. All members and others interested in electroplating are urged to attend. There will be presented a number of important papers and discussions on various phases of the electroplater's art.

—S. E. HUENERFAUTH, President.

### Annual Meeting, Philadelphia Branch

The fourteenth annual banquet and educational session of the Philadelphia Branch of the American Electroplaters' Society took place November 24, at Moseback's Hall, Philadelphia, Pa. There were more than 300 persons at the banquet, and a large number of these attended the educational session, at which there was a fine program of papers and discussions.

The session started at 3.30 p.m., with Willard M. Scott presiding. He called upon Horace H. Smith, president of the American Electroplaters' Society, to give the address of welcome. The technical papers followed.

Leroy Beaver, of the Beaver Metallic Burnishing Material Company, presented an interesting paper on *The Use of Metallic Barrel Burnishing Materials*.

**What We Have Learned from Sargent's Chromium Solution** was the subject of a paper by Charles H. Proctor, Founder of the American Electroplaters' Society and Plating-Chemical Editor of *THE METAL INDUSTRY*. His views brought forth considerable discussion.

George B. Hogaboom, of the Hanson-Van Winkle-Munning Company, Matawan, N. J., next conducted the *Question Box*, a rapid discussion of various plating subjects. This was similar to a subject that had been prepared by Dr. A. K. Graham, so that the latter gave over his time to Mr. Hagaboom. This was one of the high spots of the meeting, and it ended only because the time allowance ran out. There appeared to be material from many such discussions.

Dr. William Blum, electroplating expert, of the United States Bureau of Standards, Washington, D. C., gave a summary of the work on electroplating done at the Bureau of Standards during the past year. His talk was loudly acclaimed.

George Gehling announced that all the papers and discussions heard at the meeting would be printed in the *Souvenir Year Book* of the Philadelphia Branch, which would be mailed to all those who registered for the annual meeting. Persons who did not register, he stated, could receive the book by addressing him at 5001 Edmund Street, Philadelphia.

There was an hour from 6.15 to 7.15 during which the platers and their friends renewed old acquaintances, talked shop and generally enjoyed themselves. At the end of this period the banquet began, and all regaled themselves with a glorious turkey dinner, the equal of any ever served in the Quaker City.

Bob McKee of the Philadelphia Branch outdid himself in providing music and talent. After the feast, souvenirs and favors were distributed, and at 10 p.m. the floor was cleared for dancing, which lasted until midnight, the curfew hour in Philadelphia. However, some of the visiting platers, not accustomed to such early closing hours, formed a party and went to a hotel, where a private hall was procured and the gaiety continued into the wee hours.

#### MANY OUT-OF-TOWN VISITORS

The Philadelphia Branch was honored by the attendance of a great many of out-of-town platers, including, besides those heretofore mentioned, Frank Mesle, past president of the Society; Philip Sievering, George J. Wagner, Royal F. Clark and Oliver J. Sizelove of Newark, N. J.; Thomas A. Trumbour, William G. Schneider, Philip Morningstar, of New York City; Mr. and Mrs. John C. Oberender of New Haven, Conn., who celebrated their silver wedding by attending the Philadelphia Branch Annual Meeting for the tenth time; Van Winkle Todd, Matawan, N. J.; a delegation of 46 from Camden, N. J., headed by Albert Keiser, of the Victor Talking Machine Company; and a delegation of 40 from Newark, including those from Newark who are mentioned above, headed by Horace Smith.

—GEORGE GEHLING.

### Institute of Metals Division

HEADQUARTERS, 29 WEST 39th STREET, NEW YORK CITY  
ANNUAL LECTURE

Ulick R. Evans, Cambridge University, Cambridge, England, will deliver the Annual Lecture of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, during the week of February 18, 1929, when the annual meeting of the Institute will take place.

Mr. Evans will lecture on the subject of **Corrosion**, and he will preside at the Symposium. Following the Annual Lecture, Mr. Evans will deliver groups of lectures in such centers as New Haven, Conn.; Cambridge, Mass.; Cleveland, Ohio; Pittsburgh, Pa., and Washington, D. C., with single lectures at various other points.

#### MEMBERSHIP

As a result of efforts of the Membership Committee, the Division reports a membership increase of 192 since the February meeting, bringing the total Division membership to 1196. As the membership of the American Institute of Mining and Metallurgical Engineers is about 8800, a representative proportion is seen to be interested in the work of the Division.

The secretary of the Division presented in person at the annual meeting, on May 8, an invitation to the British Institute of Metals, London, England, to hold their meeting in 1932 in this country. This invitation was accepted formally and has been delivered to the president of the American Institute of Mining and Metallurgical Engineers.

### National Founders Association

HEADQUARTERS, 29 SOUTH LA SALLE STREET, CHICAGO, ILL.  
ANNUAL CONVENTION

The National Founders Association held its Thirty-second Annual Convention on November 21 and 22, at the Hotel Astor, New York City. The two days were devoted to various committee and group activities, during which a number of interesting papers and discussions were heard. Among these were the following:

**Report of Committee on Foundry Methods**, by D. R. Wilson, chairman.

**Report of Committee on Foundry Costs**, by John L. Carter, chairman.

**Discussion of Foundry Salsmanship**, by C. H. Hoffstetter, Odin Stove Manufacturing Company, Erie, Pa.

**What Foremen Should Think About**, by L. A. Hartley,

director of industrial education, National Founders Association.

**Melting Practice**, by H. M. Lane, Detroit, Mich.

The following new officers were elected: President, T. S. Hammond, Whiting Corporation, Harvey, Ill.; vice-president, D. F. O'Brien, A. P. Smith Manufacturing Company, East Orange, N. J.; secretary (re-elected), J. M. Taylor, 29 South La Salle Street, Chicago, Ill.

The regular convention dinner took place Wednesday evening, November 21. James A. Emery, the Association's counsel, was toastmaster. There was an address, **The Dimensions of Life**, by John L. Lavis, D. D., at the dinner.

### Metropolitan Brass Founders' Association

HEADQUARTERS, CARE OF WM. E. PAULSON, 97 SECOND AVENUE, BROOKLYN, N. Y.

The Metropolitan Brass Founders' Association held a social gathering on the evening of October 24th, with fourteen members present. This was the first meeting of the Association entirely social in nature.

W. E. PAULSON, Secretary.

### Consulting Chemists Association

HEADQUARTERS, CARE OF C. V. EKROTH, 461 EIGHTH AVENUE, NEW YORK CITY

A group of the leading professional consultants representative of all branches of chemistry and chemical engineering met recently at the Chemists' Club in New York to perfect the organization of the Association of Consulting Chemists and Chemical Engineers. A constitution and by-laws were adopted.

The objects of the organization are to advance the science and practice of consulting chemistry and chemical engineering; to further the service of the profession of its clients, to the public, and to all branches of the Government; and to promote friendly intercourse and cooperation among its members so that their welfare be furthered and the highest ethical standards of the profession be maintained.

The following Officers were elected: President, Hal T. Beans of Columbia University; vice-president Irving Hochstadter of Hochstadter Laboratories; secretary, Clarence V. Ekrøth of Ekrøth Laboratories; treasurer, Jerome Alexander. The following were elected Directors: Charles V. Bacon, Frank C. Gephart, Robert Schwarz, Albert M. Smoot, Albert G. Stillwell, Arthur W. Thomas, John Morris Weiss, and Thomas A. Wright.

Additional information in regard to this Association is obtainable from the secretary at 461 Eighth Avenue, New York, N. Y.

### Personals

#### Charles Pack

Charles Pack announces his resignation as first vice-president and assistant general manager of the Doehler Die Casting Company, New York.

Mr. Pack, who is a chemical engineer, entered the employ of the Doehler Die Casting Company in 1911, after two years experience in a consulting chemical laboratory. He organized the first chemical laboratory for the Doehler Die Casting Company and later became the chief chemist and metallurgist of that company. In 1921 he became general production manager, in full charge of production at all Doehler plants. Later, he became assistant general manager of the entire company and for exten-



CHARLES PACK

sive periods has acted as general manager of the Doehler company. He was elected a director, later secretary, and finally first vice-president of the Doehler Die Casting Company.

Mr. Pack is the inventor of many methods and processes pertaining to non-ferrous metal founding, and to die-casting practice in particular. He has also been a regular contributor to the literature of the industry and has lectured before many of the technical societies, and in technical colleges such as the Massachusetts Institute of Technology, the Brooklyn Polytechnic Institute and others.

Mr. Pack will hereafter be engaged in the consulting engineering business, specializing in die-casting practice, with offices in the Woolworth Building, New York, Suite 2720.

#### Sam Tour

Sam Tour, who recently resigned as metallurgist for the Doehler Die Casting Company, Batavia, N. Y., is doing general consulting work in metallurgy, with headquarters at Batavia. He is specializing in die castings and salt baths for heat treating.

Sam Tour is a graduate of the University of Colorado in chemical engineering. He was teaching assistant in chemical engineering at the University of Michigan for one year and appointed to a Michigan Gas Association Fellowship at the University of Michigan for one year. He holds a Master of Science degree from that university. Elected to membership in Alpha Chi Sigma

and Phi Lambda Upsilon, Honorary Chemical Fraternities and Tau Beta Pi, Honorary Engineering Fraternity.

During the war Mr. Tour was in the Metallurgical Division, Ordnance Department, U. S. Army, stationed at Bethlehem for a time as Engineer of Tests, then at Pittsburgh as District Metallurgist in charge of all metallurgical testing and inspection work for Ordnance Department in western Pennsylvania and West Virginia. After the war he continued with the Ordnance Department in the Metallurgical Section of the Technical Staff attached to Office of the Chief of Ordnance, U. S. Army, Washington, D. C. He was in charge of the Metallurgical Section for two years, the work being largely the co-ordinating

of metallurgical information and experience during the war and carrying out of numerous researches. Considerable has been published on some of these researches by the various men who worked under Mr. Tour. The research work was carried on at the Bureau of Standards, the Fixed Nitrogen Research Laboratory, the various Government arsenals and the University of Michigan. Some of the major problems were "Steels to Withstand Ammonia in the Manufacture of Synthetic Ammonia," "Machine Gun Barrel Steels," "Light Armor Plate," "Magnetic Analysis of Steels," "Season Cracking of Cartridge Brass," "Grain Size and Hardness of Worked Brass," "Steels for Elevated Temperatures."

Since 1921 Mr. Tour has been metallurgist with the Doehler Die Casting Company, first at their plant in Brooklyn, N. Y., and for the last three years at their new plant in Batavia, N. Y. He is a past chairman of the Washington, D. C., and New York City Chapters of the A. S. S. T.; secretary of the American Society for Testing Materials, Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys since its organization some years ago. He is a member of American Society for Steel Treating, American Society for Testing Materials, American Chemical Society, Society of Automotive Engineers, and American Institute of Mining and Metallurgical Engineers.

**Wadsworth Doster** of Watertown, Conn., who resigned last July as assistant sales manager of the Mackintosh-Hemphill



SAM TOUR

Company, Pittsburgh, Pa., has joined the United Engineering and Foundry Company, Pittsburgh, as its eastern representative. Mr. Doster has had extensive experience in the manufacture and sale of rolling mill machinery. He has been with The Torrington Manufacturing Company, Sundh Engineering and Machine Company and The Blake and Johnson Company's machinery division at Waterbury, Conn. Mr. Doster will retain his residence at Watertown, Conn.

**Arthur D. Eaton**, formerly of Dodge Brothers, Inc., has been elected vice-president of Aluminum Industries, Inc., Cincinnati, Ohio, and will assume active charge of the latter company's sales. He will be located in the firm's new Detroit office in the Fisher Building. Aluminum Industries, Inc., manufactures aluminum pistons.

**E. S. Carman**, formerly chief engineer of the Osborn Manufacturing Company, has organized Edwin S. Carman, Inc., engineers, handling general industrial engineering problems, especially foundry work. The company has offices at Carnegie Hall, Cleveland, Ohio.

**H. Parker** has been placed in charge of the new plant of the Rome Wire Company at Mobile, Ala. He was formerly purchasing agent at Rome, N. Y., and has been succeeded there by **Stanley O. Williams**.

**Leslie McArthur**, Chicago, Ill., has been appointed general manager of the Bassick Company, Bridgeport, Conn., succeeding **Harry O. King**, who recently resigned to accept a similar position with the Sikorsky Airplane Company. Mr. McArthur was formerly with the Stewart Die Corporation.

**Charles M. Schwab**, noted steel maker, has been awarded the Bessemer gold medal by the Iron and Steel Institute of England.

**H. C. Flohr**, formerly secretary of the Panel Tile Corporation, has joined the sales division of Maas and Waldstein Company, Newark, N. J., manufacturers of lacquers, enamels, solvents. **H. B. Wait**, who is also well known to lacquer users in New Jersey and the metropolitan district of New York, has joined the company in a similar capacity.

**Howard E. Oberg**, who, for several years, has represented the Billings and Spencer Company's machinery division at Detroit, has been called in to the main office at Hartford to become sales manager of the machinery division.

**R. C. Bryant** has been awarded the Cushman Fellowship for 1928-1929 at Western Reserve University, Cleveland, Ohio. This Fellowship was established several years ago by H. D. Cushman, president of The Ferro Enameling Company, Cleveland, Ohio, and is for the investigation of problems connected with the process of porcelain enameling. Mr. Bryant is a graduate of Western Reserve University.

**Herman L. Pump**, formerly with the Kalamazoo Stove Company, Kalamazoo, Mich., is now associated with the Ferro Enamel Supply Company, Cleveland, Ohio.

**D. E. MacLean** has been appointed assistant sales manager of the Lava Crucible Company of Pittsburgh, Pa.

## Obituaries

### John R. Searle

John R. Searle, of Detroit, Mich., for many years identified with the copper and brass industry in the east and midwest, died on October 24, 1928, after an illness lasting several months. Until it was purchased by the Bohn Aluminum and Brass Corporation, Mr. Searle was president and general manager of the Michigan Smelting and Refining Company, Detroit. He had also been assistant general manager of the Detroit Copper and Brass Rolling Mills, Detroit, at one time.

F. J. H.

### William T. Macfarlane

William T. Macfarlane, founder, and for 30 years president, of the Bridgeport Crucible Company, Bridgeport, Conn., died recently after a lengthy illness.

Mr. Macfarlane was born in Massachusetts. He came to Bridgeport in 1886 and the following year he went into the crucible business. In 1904 his firm purchased the Taunton Crucible Company, Taunton, Mass., and operated it as a branch plant.

The business was sold to a Buffalo concern in 1916, and Mr. Macfarlane retired.

### Walton H. Meagley

Walton H. Meagley, of Berlin, Conn., assistant sales manager for the Corbin Screw Corporation, New Britain, Conn., died suddenly at his home on November 11 as a result of arteriosclerosis. Mr. Meagley was fifty years of age and had been with the company for 25 years. He is survived by his widow, two sons and a daughter.

—W. R. B.

### John Bernard Walker

John Bernard Walker, editor emeritus of "Scientific American," and author of "The Unsinkable Titanic," "The Story of Steel," and many other works, died on October 17, 1928, after an illness of three months. Mr. Walker had retired from his position as editor of the above-named journal on January 1, 1928, after serving it for many years. He was born at Bournemouth,

England, in 1858; in the late eighties he came to this country and after some years became an American citizen.

### Sylvester K. Merrill

Sylvester K. Merrill, one of the oldest manufacturing jewellers in the Providence, R. I., district, died November 3, 1928, at his home, 86 Providence Street, Cranston, R. I. He was 88 years of age. He began his business career at sixteen, as an apprentice jewelry maker. In 1872 he founded the S. K. Merrill Jewelry Manufacturing Company, Providence, which was one of the leading concerns there for some decades. Three years ago he retired and the firm was liquidated.

Mr. Merrill was active in public life, having been a member of the Cranston Town Council, State Senator from Cranston, and a member of the Manufacturing Jewelers' Board of Trade.

He is survived by a daughter, Mrs. Robert S. Budlong, seven grandchildren, and seven great-grandchildren.

### John F. McCue

John F. McCue, for the past thirty years employed by the Russell and Erwin Company, New Britain, Conn., died of heart disease while at work on October 30, 1928. For the past twenty years he had been a foreman in the mechanical engineering department.

—W. R. B.

### Dr. Klatzman

Dr. Klatzman, general manager of Chromplate, Inc., 599 Eleventh Avenue, New York City, died of heart failure Monday, November 26, 1928.

## News of the Industry

### Industrial and Financial Events

#### New Tin Organizations

The National Metal Exchange, recently formed at New York City for the purpose of carrying on trading in metals, has formulated, and its Board of Directors has approved, rules and by-laws governing the institution. The new rules clear up a misunderstanding which had become quite general among London tin interests. This was to the effect that the new exchange here would deal in Straits and other specific qualities of tin. According to the rules, this is not so. The dealings in tin will be confined to Standard futures.

Twenty-four brands of tin will be deliverable against the contracts of the National Metal Exchange, which will begin trading on Dec. 3, it was announced by President Erwin Vogelsang. Sixteen of the brands, designated as Class A, will be deliverable at the contract price and eight Class B brands, at 1½ cents a pound under the contract price.

The tenderable brands follow:

Class A—Banka tin. The following brands of Straits tin: Straits Trading Company, Eastern Smelting Company, Po Hin, Ban Hok Hin. The following brands of English refined tin: Williams Harvey Mellanear refined, Penpoll special refined, Cornish refined, Capper Pass & Son. The following brands of German refined tin: Th. Goldschmidt "Baum," Berzelius "Rose Brand," Zinnwerke Wilhelmburg refined. The following brand of Belgian refined: Union Miniere du Haut Katanga. The following brands of Australian refined: O. T. Lempriere & Co., Mount Bischoff, Pyrmont.

Class B—The following brands of English common: Williams Harvey Mellanear common, Penpoll common, Cornish common, Thames Metal Company. The following brands of German common: Th. Goldschmidt "Volta," Th. Goldschmidt "Tego," Zinnwerke Wilhelmburg common. The following brand of Chinese tin: Chinese No. 1.

The American Tin Trade Association, another new organization, was formed at a meeting of tin dealers and brokers on October 24. It is an independent body which has filed a certificate of incorporation which states that the purposes of the Association are to promote the best interests of persons and firms engaged in sale, purchase, consumption, transportation and distribution of pig tin; to foster trade in tin; to adjust controversies; disseminate information; and to assist and co-operate with any organization or exchange whose objects are in whole or in part similar to those of the American Tin Trade Association.

#### Britain Importing Bronze Wire

The British General Post Office has just placed a big order in Germany for bronze wire needed in the telephone service, in addition to an order for the same material which was placed in France several weeks ago. At the time of placing the French order the Post Office issued a statement defending its action, and it has now issued a supplementary statement with regard to the German contract in part, as follows:

"The placing of the Post Office order for a supply of bronze

wire was withheld for some time, while efforts were being made to secure a reasonable reduction in the quotations which British firms, by agreement between themselves, uniformly tendered. These efforts failed, and accordingly the order for immediate needs, which were acute, was divided between a French firm and a German firm at prices very substantially below the uniform prices of the British tenderers. It is repeated that the Post Office made every effort to induce the British firms to quote a reasonable price, and even suggested to them a price (allowing a substantial margin over the foreign prices) at which it was ready to place a large order at once."

On behalf of the manufacturers whose tenders were rejected, it was stated that the contract to which attention was called last month was placed with the Trefiliere Company, of Le Havre, and that from 1,000 to 1,200 tons of this wire had been purchased in a normal year from British firms at an approximate average cost of £100 (\$500) per ton. The value of the contract placed in Germany is understood to be about £60,000 (\$300,000), but the Post Office states that it is the settled policy of the Government not to disclose contract prices, and the figure quoted is unofficial.

In view of the position outlined above, it is anticipated that in future the Post Office will consider wire tenders from any other countries abroad that care to compete for the business.—A.C.B.

#### Chase Brass to Build Mill in West

Chase Companies, Inc., Waterbury, Conn., plan to build a brass and copper mill in Cleveland, according to an announcement by Frederick S. Chase, president. Apparently, the new mill will be operated by the Chase Brass and Copper Company, a subsidiary selling organization of Chase Companies, Inc. Mr. Chase, speaking of the plan, says:

"For some years we have felt the growing need of a mid-western mill. Our customers in the Middle West have increased in number and at the same time the volume of business of our old customers has naturally increased with the general and rapid development of their territory. The acquisition of the U. T. Hungerford Brass and Copper Company with its nationwide sales, in addition to our own sales, has also made us feel the increasing need of such a mill. It will enable us to supply our mid-western customers' immediate needs without delay in shipment.

"With this object in mind, we expect to acquire a well located tract of land in Cleveland and promptly to erect the first buildings of a brass mill that will be capable of extension as necessary. The generally increased use of copper and brass and the promise of future development in the variety and volume of its uses, together with the limitations of our present plant activities in Waterbury, make us feel that we should no longer postpone action in the matter.

"We expect to announce the definite location of the land as soon as certain negotiations which are at present being carried on have been completed. As quickly as practicable after the location of the land has been determined, erection of buildings will begin and we hope to have the new plant in production very

soon. It is impossible to give any estimate of the time required to do this, but we will push it as fast as possible.

The building of a mid-western plant is only one more step in the plans for expansion and development of the Chase Brass and Copper interests.

—W.R.B.

### Oakite Company Holds Annual Dinner

More than 260 members and guests of Oakite Products, Inc., New York City, attended the company's annual dinner, which was in the form of a cowboy round-up, at the Hotel Pennsylvania, New York City, on Friday evening, November 16. The evening was enlivened by much music and the fine spirits of all who were there. Every man was provided with bandana neckerchief and a wide-brimmed hat; coats were removed right at the table; in every way it was a friendly affair. A unique feature was the use of tin cups and plates, no tablecloths, and in general a "ranchy" atmosphere. With the exception of a short address by D. C. Ball, president of the company, there were no speeches.

#### ANNUAL SALES CONFERENCE

Completing 20 years of industrial cleaning service, the technical staff, field service men and executives of Oakite Products, Inc., met in the general offices in New York, November 14 to November 17, for the annual sales conference. District managers and representatives from thirty-three States and Canada came together in daily discussion, subjects of which ranged from the cleaning of watch crystals to ocean liners and silk stockings to eighty-thousand-barrel oil storage tanks. One of the interesting phases of the convention was the demonstration of paint stripping on the side of a full side locomotive tender, the operation being performed by apparatus designed and built by the service department of Oakite Products, Inc.

On Friday, November 16, W. H. Bruce, publisher of "School Board Journal," and Frank O. Dunning, eastern manager, addressed the conference on the importance of cleanliness and sanitation in schools and institutions; W. E. Irish, associate editor of "American Machinist," gave an address on cleaning operations in the machine tool and accessory field; P. W. Swain, managing editor of "Power," spoke of the need for further developing cleaning methods in the power plant field. W. Drew, eastern district manager of "Bus Transportation," also spoke, stressing the importance of cleaning operations that are necessary in connection with servicing the more than 25,000 bus fleets in the U. S.

Among the papers presented were: Oakite Developments in the Wire Industry; Operations with Oakite Materials in Printing, Lithographing and Electrotyping Plants; Handling the Railroad's Cleaning Problems; Daily Cleaning Operations for the Oil Industry; The Aims of the Oakite Service Department; Bringing Good-will with Oakite Laundry Compound.

### Brass Mill Merger

According to press reports, a merger is contemplated which will include a string of mills from the Atlantic Coast to the Middle West. The eastern plants will specialize in copper sheets, but brass will also form a large part of the output of this combination.

The American Smelting and Refining Company, it is stated, will be the controlling factor in this organization, but no information is obtainable at this time about the mills which are being combined. It is reported, however, that the following companies are involved: Baltimore Sheet Mill of the General Cable Company; Taunton-New Bedford Copper Company; Dallas Brass and Copper Company; Michigan Brass and Copper Company; and Rome Brass and Copper Company.

### Guide Motor Lamp Company Sold

The Guide Motor Lamp Manufacturing Company, Cleveland, Ohio, has sold its entire assets to the General Motors Corporation, for a consideration of about \$1,000,000. The company will be operated as part of the Delco-Remy Corporation, subsidiary of General Motors, with the same management as heretofore. The Guide company was a pioneer in motor lamp manufacture, owning patents on headlights which have been adopted as standard equipment on many well-known makes of cars, including a number that are made by General Motors.

### British American Tube Mills Operate

The National Electric Products Corporation has completed and placed in operation the tube mills of its British American Tube Division, Bayway, N. J. Brass pipe and condenser tubes are being produced, the new works replacing those at Plainfield, N. J., destroyed by fire early this year. The new mills have two to three times the capacity of the old works, equipment including most modern machinery and complete electrical operation.

### Billings and Spencer Reorganization

The reorganization of the Billings and Spencer Company, Hartford, Conn., reported on page 498 of our previous issue, is progressing steadily, according to a communication from A. H. Deute, vice-president of the company. He says, in part, that for some time it has been apparent that a new organization will be necessary if the company is to develop properly. "All the old Billings and Spencer lines will be continued," he says, "but in addition to these, the company will push more aggressively than ever the sale of its drop forging machinery. It will also expand its line of branded merchandise; the first move in this direction being the announcement of a complete line of Billings and Spencer forged steel golf clubs."

Along with the financial reorganization of the corporation there are to be important changes in the physical equipment and layout of the manufacturing plant. Considerable new machinery is to be purchased and the present mechanical equipment is to be moved to the first floor, leaving two upper floors available for rental. The concentration of operations on the first floor of the plant will bring about material reductions in overhead and increase efficiency of production at the same time. Part of the floor space in the building is already rented to other concerns and the new arrangement will make more rental space available.

### Much Copper for Electrification

Electrification by the Pennsylvania Railroad of 325 miles of line and 1,300 miles of track, as announced by President W. W. Atterbury, will call for the use of approximately 55,000,000 pounds of copper, according to an estimate just completed by the Copper and Brass Research Association.

More than half of the copper which will be used for the electrification will go into overhead wiring, or catenary construction, which will require approximately 30,000,000 pounds. The 365 new electric locomotives called for in the program will consume approximately 14,000,000 pounds of copper. About 6,000,000 pounds will go into transformers and substations and an additional 5,000,000 pounds into the 218 multiple unit trains to be operated.

### Hoover in Silver

The Medallic Art Company, 210 East 51st Street, New York, reports that on the morning after the election, they struck off a Silver Medal and sent it by air mail to Mrs. Hoover in Palo Alto, California. On one side was the portrait of President-elect Hoover and on the other an inscription to Lou Henry Hoover, in commemoration of the election, November 6, 1928. During the campaign, the company made bronze medals of the candidates.

### General Bronze Corporation

General Bronze Corporation, New York, reports for the quarter ended September 30, 1928, surplus of \$242,555 after charges and preferred dividends, as compared with \$166,400 the preceding quarter and \$94,291 at the end of March, 1928. Surplus for the first 9 months of 1928 amounted to \$503,247 after preferred dividends, etc.

### Doehler Die Casting Company

The Doehter Die Casting Company reports for the first nine months of this year a profit of \$540,160 after charges, but before Federal taxes, compared with \$353,397 in the corresponding period last year. Shipments in October exceeded \$1,000,000, making that month the best in the company's history.

### Lead Industries Association

The Lead Industries Association was formally organized on November 15 by producers and consumers of lead. In general the association intends to promote the serviceability of the lead industries to the community at large, and will parallel some of the activities of existing organizations in other non-ferrous metal industries. The association also expects to disseminate accurate information regarding the use of lead products; to collect statistical information relating to the production, distribution, marketing and consumption of lead and lead products, and to develop methods for improving the welfare of those engaged in the lead industries.

Membership in the Lead Industries Association will comprise corporations interested in the mining, smelting or manufacturing of lead in the United States, Mexico, Canada and South America. Some of the companies, besides mining and smelting concerns, to be represented in the organization are: Federated Metals Corporation, Fleck Brothers Company, General Cable Company, Glidden Company, National Lead Company, Remington Arms Company, Sherwin-Williams Company, United Metals Selling Company, and U. S. L. Battery Corporation.

The following officers were elected at the meeting: President, Clinton H. Crane, president of St. Joseph Lead Company; vice-presidents, Hamilton M. Brush and Ralph M. Roosevelt; secretary-treasurer, Felix E. Wormser.

### Galvanized and Enamelled Ware

The United States Department of Commerce reports that September shipments of galvanized sheet-metal ware, as reported by fifteen concerns comprising a large proportion of the industry, were 189,789 dozens, valued at \$742,188, as compared with 186,864 dozens in August, valued at \$746,580; and 172,382 dozens in September, 1927, valued at \$695,077. The galvanized ware included in this summary is the product resulting from dipping made-up shapes in molten zinc and not utensils of galvanized sheets.

September shipments of enamelled sheet-metal ware, as reported by 18 manufacturers, comprising approximately 80 per cent of the industry, were 352,484 dozens, valued at \$1,372,242, as compared with 358,811 dozens, valued at \$1,354,316 in August, and 310,823 dozens, valued at \$1,285,854 in September, 1927. The enamelled ware included in this summary consists of cooking, household, and hospital utensils having a vitreous coat on a sheet steel or iron base and does not include equipment such as stoves, heaters, signs, etc.

### Standardization of Plumbing Equipment

Active work on the standardization of plumbing equipment by a sectional committee of technical experts is now under way, under the auspices of the American Standards Association. William C. Groeniger of the American Society of Sanitary Engineering is chairman of the sectional committee which includes four sub-committees organized under the Division of Simplified Practice of the United States Department of Commerce. The object of the work is the improvement of plumbing materials, and the elimination of the difficulty now experienced in matching worn out faucets, bath fixtures, and other plumbing equipment. A. M. Maddock, of Thomas Maddock Sons Company, heads the sub-committee on "staple vitreous china plumbing fixtures." The

chairman of the sub-committee on "enameled sanitary ware" is to be appointed, as are the chairmen of two other sub-committees on waste traps and on brass plumbing products.

### Firearms and Ammunition Output

The Department of Commerce announces that, according to data collected at the biennial census of manufacturers taken in 1928, the establishments engaged primarily in the manufacture of firearms in 1927 reported products valued at \$19,452,372, an increase of 28.2 per cent as compared with \$15,179,363 for 1925, the last preceding census year. Of the 20 establishments reporting for 1927, 8 were located in Connecticut, 4 in Massachusetts, 4 in New York, 1 each in Colorado, Michigan, Oklahoma, and Pennsylvania.

The total production of ammunition and related products in 1927 was valued at \$43,463,673, an increase of 5.7 per cent as compared with \$41,126,421 reported for 1925, the last preceding census year. The 1927 total comprises \$41,230,365, representing the value of ammunition and related products made by establishments engaged primarily in this line of manufacture, and \$2,233,308 reported as the value of ammunition, etc., made as secondary products by establishments engaged primarily in other industries.

### Babbitt-Metal Consumption

The total apparent consumption of Babbitt metal in October, based on reports received by the United States Department of Commerce from 31 firms, was 5,796,419 pounds as compared with 5,308,403 in September and 5,115,598 in October, 1927. This consumption is calculated from sales by manufacturers and consumption by those firms (among them several important railroad systems) which consume their own production.

### Bronze Memorial for Mules

The mules and horses who served in the World War are to have a memorial in the form of a bronze tablet in the State, War and Navy Building at Washington, D. C. Of 243,133 such animals used by the American forces in France, death took 68,682, the tablet states. It also has a quotation by General Pershing, praising these silent, faithful warriors.

### Aluminum Ceilings

According to an article in the "New York Times Magazine" of November 25, by Walter R. Storey, a specially decorated room by Donald Deskey included aluminum sheet for ceilings. In this room aluminum furniture was also used.

### Incorporations

**Dorchester Brass and Aluminum Foundry, Inc.**, Boston, Mass.; capital, 1,000 shares no par; to operate brass, bronze and aluminum foundry; by M. W. Riley, O. W. Swangren and Mary J. Riley.

**W. C. Bastien Company, Inc.**, Houston, Texas; capital stock, \$5,000; to manufacture and sell jewelry supplies, etc.; by W. C. and F. C. Bastien and A. Walzel.

**Avery Battery Manufacturing Company**, Houston, Texas; capital, \$7,500; by R. M. Livesay and associates.

## Business Reports of The Metal Industry Correspondents

### New England States

#### Waterbury, Conn.

DECEMBER 1, 1928.

The American Brass Company has purchased the plant and land of the former Brown Copper and Brass Rolling Mills in New Toronto, Canada. The local concern has occupied and operated the plant under lease ever since it purchased the business of the Canadian company several years ago. The tract purchased includes 12 acres of land. The price paid is said to be in the vicinity of \$500,000. Clifford F.

Hollister, treasurer of the local company, and M. S. Moss, manager of the Anaconda interests, carried on the negotiations with Alan Brown's, Ltd., Capital Trust Corporation and S. D. Murchinson.

Frederick S. Chase, president of the Chase Companies, Inc., was elected vice-president of the Copper and Brass Research Association at its annual meeting in New York last month. He was also named a director and member of the executive committee. John A. Coe, president of the American Brass Company was named a director and a member of the execu-

tive committee, and **Edward O. Goss**, president of the **Scovill Manufacturing Company** was chosen a director.

**John D. Ryan**, chairman of the board of directors, and **Cornelius F. Kelley**, president, of the **Anaconda Copper Mining Company**, visited Waterbury, Torrington and Ansonia last month to inspect the plants of the **American Brass Company**, Anaconda subsidiary. **John A. Coe**, president of the **American Brass Company** left with them to inspect the plants in New York, Canada and the West. Messrs. Ryran and Kelley denied that the present trip foreshadowed any radical extensions or changes in the local plants, saying that it was merely a trip of inspection. While no additions are planned, the Valley plants are constantly being improved with more modern equipment and methods, they said. The Torrington plants have practically been rebuilt in recent years. One of the purposes of the trip is to see where similar improvements may be effected elsewhere.

The \$60,000 addition of the **French Manufacturing Company** is rapidly nearing completion and already the company is planning to start on another addition as soon as this one is finished. The present addition is 200 by 60 feet. When the proposed addition is completed the plant will be triple the size it was five years ago. Production of greater lengths of brass and copper tubing, for which orders have been received, is planned. The officers say the additions are always based on business already received, rather than on the expectation of future increases.

**W. H. Bristol**, president of the **Bristol Company**, makers of recording instruments, has sold to the **Acoustics Products Company** of New York, his patents on the "Bristolphone," a development of the talking-moving picture idea on which he has been working for many years. However the manufacturer of the "Bristolphone" will continue in this city and the local plant of the **Bristol Company** will be greatly increased in size. **Western Electric Company**, affiliated with the **Vitaphone Company**, has agreed that the "Bristolphone" apparatus is interchangeable with films and projection machines made by it and that consequently the "Bristolphone" need not be excluded from theatres because of any licensing litigation over interchangeability. The **Acoustics Products Company**, holding company for the **Sonora Phonograph Company**, is expected to merge with the **W. H. Bristol Talking Pictures Corporation**, a subsidiary of the **Bristol Company**, and have its main plant in this city. It is reported, although it has not been confirmed, that Mr. Bristol is to receive \$2,500,000 for his patents on the apparatus.

Among patents granted to local men last month are: **Morris Bennett**, assignor to **Scovill Manufacturing Company**, variable condenser; **Philip Reutter**, assignor to the same, vanity case; **Richard Wilcox**, assignor to **Waterbury Farrel Foundry Company**, machine for making commutator segments; **George A. King**, assignor to **Scovill Manufacturing Company**, all-wire pin fastener; **Frank Warner**, assignor to the same, tack fastener stud.

**Waterbury Fastener Company** has secured authorization to increase its stock from \$50,000 to \$250,000 by the issuance of 200,000 shares of common and 50,000 shares of preferred stock.

—W. R. B.

#### Connecticut Notes

DECEMBER 1, 1928.

**HARTFORD**.—Stockholders of the **Billings and Spencer Company** last month approved the proposed reorganization plan of the company which will wipe out the company's bonded and note indebtedness, provide a larger working capital and turn the company's property over to a new company under the same name.

Objection of the federal government to the recent consolidation of the **Arrow Electric Company** and **Hart and Hegeman, Inc.**, has led the directors of **Arrow-Hart and Hegeman, Inc.**, to recommend that the company be dissolved. The government has held the merger to be a violation of the anti-trust act. The assets will be distributed to the stockholders in such a way that while the holding company will be dissolved each stockholder will receive proportionate shares of the stock of both companies. The operation of the businesses of the **Arrow Electric Company** and **Hart and Hegeman, Inc.**, will continue as heretofore and the value of the interests of the stockholders will not be affected by the

proposed plan, it is said. After this is gone through with there is expected to be an actual consolidation of the two companies.

Earnings of the **Underwood-Elliott Fisher Company** are expected to be much better for the third quarter than they were in the second, when they totaled \$783,000.

**Pratt and Whitney Company** has perfected a new automatic machine which is said to produce gears equal to the highest quality now produced by the most exact methods of shaping and grinding. It employs a gear-shaving process and, it is said, will enable automobile manufacturers to use gears comparable with those in the highest-priced American and European cars at a cost less than the poorer gears now used. **Chrysler Motor Company** is already using some of these machines and reports its gears cost 25 per cent less and are superior to former gears.

**John H. Goss**, vice president of **Scovill Manufacturing Company**, Waterbury, was elected vice-president of the Manufacturers Association of Connecticut at the annual meeting here last month and **E. Kent Hubbard**, Middletown, was reelected president. **Robert C. Buell** of **Robert C. Buell and Company**, this city, was elected secretary and treasurer.

**NEW BRITAIN**.—**Russell and Erwin Manufacturing Company** is making hardware to outfit the new home of the recently crowned Japanese emperor. It has already shipped doorchecks, knobs, latches, window catches, etc., to Japan for this purpose. All are of a single pattern and enamelled in white.

**Landers, Frary and Clark** plan erection of a new factory building at its south end plant. It will be 130 by 200 feet, cost \$100,000, and will be used for an enameling department.

Directors of the **Goss and DeLeeuw Machine Company**, Kensington, a suburb of New Britain, have voted to increase the capital stock from \$200,000 to \$250,000.

**President George T. Kimball** of the **American Hardware Corporation** vehemently denied reports spread about the city before election that employees of the plants were being intimidated into voting for the Republican candidate. He declared that the company wanted all its employees to vote exactly as their consciences and responsibilities directed them.

**Landers, Frary and Clark**, with the Sunset Rock Association, have given the state a 13 acre park on Bradley Mountain.

**BRIDGEPORT**.—**L. Samuelson**, of the **Lorraine Metal Manufacturing Company**, reports that confidence men are attempting to cheat local metal concerns through buying scrap. They come to a factory, he says and offer to buy up all the metal scrap at a higher price than usual, then bring up a truck and helpers and start weighing the scrap on the factory scales. While one of the purchasers engages the seller in conversation, the truckmen substitute one of their own counter weights for the seller's, thereby getting two pounds at the price of one. This was tried on him recently, he said, and he did not discover it until too late. It is easily worked in the case of aluminum, he says, as it is hard to estimate the weight of that metal in scrap. He has reported it to the local Manufacturers' Association, and its manager, **Alpheus Winter**, has sent a bulletin to other manufacturers warning them of the game.

**The American Chain Company** has declared its regular quarterly dividend of \$1.75 a share on preferred stock, payable December 31 to stockholders of record December 21.

The general contract for the construction of a storage building at the **American Tube and Stamping Company** plant has been awarded. It will be 40 by 100 feet, two stories high, of steel and brick construction.

**Harry O. King**, a director of the **Sikorsky Manufacturing Corporation**, visited this city last month and predicted that an airplane factory will shortly be erected adjacent to the city's flying field.

**BRISTOL**.—**Sessions Foundry** reports better business now than for a long time. The upturn started last May and the increase has been quite steady since then, it reports.

**Lemuel L. Stewart**, former manager of the **Electrical Brass Company**, of this city, has been elected president of the newly organized **Stewart and Croll Company**, Hartford. **Charles Stewart** and **Merle D. Hathaway**, also formerly connected with the local concern, have been elected treasurer and secretary, respectively. The new company is capitalized at \$50,000.

Half the departments of the **E. Ingraham Clock Company** were forced to suspend operations for one day last month due to the breaking of a connecting rod in one of the engines.

**MERIDEN.**—**International Silver Company** directors have declared the regular quarterly dividend of \$1.50 on common stock payable December 1 to stockholders of record November 15. The company reports for the quarter ending September 30 net profits of \$291,256 after depreciation, interest and federal taxes, equivalent, after allowing for 7 per cent preferred dividends, to \$2.03 a share on the common. This compares with \$240,118 or \$1.47 a share for the preceding quarter and \$342,604 or \$3.89 a share for the third quarter of 1927.

**TORRINGTON.**—All former officers were reelected at the annual meeting of the **Union Hardware Manufacturing Company** last month, as follows: Chairman of the board, Thomas J. Bryant; President, Frank J. Damon; vice-president and secretary, Harry F. Burgess; treasurer, William F. Norton; vice-president in charge of sales, Lloyd Middlekauf; vice-president in charge of production, William F. Hoerle.

**NAUGATUCK.**—F. F. Shaffer, president, and William T.

Rosenbeck, treasurer, have resigned from the **Goodyear India Rubber Glove Company** and the **Goodyear Metallic Rubber Shoe Company**. Charles T. McCarthy, factory manager, will become treasurer, and Walter H. Norton of the **Lycoming Rubber Company** of Williamsport, Penn., will succeed Mr. McCarthy. The office of president has not yet been filled.

**NORWICH.**—A new corporation taking the same name, is being organized to take over the **United Metal Manufacturing Company** of this place. It will assume all assets and liabilities. The old concern employed about 70 hands.

**STAMFORD.**—**Yale and Towne Manufacturing Company** earnings for the first nine months of this year were \$2.66 a share, compared with \$3.71 a share for the first nine months of 1927.

**THOMASTON.**—**Seth Thomas Clock Company** has declared the regular quarterly dividend of 43 1/4 cents on the preferred and 37 1/4 cents on the common stock.

**NEW HAVEN.**—**Atlas Manufacturing Company**, makers of metal specialties, is planning to erect two factory additions.

—W. R. B.

## Middle Atlantic States

### Newark, N. J.

DECEMBER 1, 1928.

**Splitdorf Radio Corporation**, High Street, Newark, will shortly sell some of its financial interests to **Thomas A. Edison, Inc.**, West Orange, according to an announcement made by both companies. The marketing of a Splitdorf radio apparatus will be discontinued December 31. The facilities of the Splitdorf plant will be employed in conjunction with those of the Edison plant, primarily in the manufacture of radio apparatus for Edison. Splitdorf will retain its separate identity, with **Charles Edison** as chairman of the board; **Walter Rautenstrauch** and **Donald Ross** will continue as president and vice president and secretary, respectively. **Arthur H. Walsh** and **Ralph H. Allen**, both officers of Thomas A. Edison, Inc., become vice-president in charge of sales and vice-president in charge of finance and operation, respectively. **H. F. Miller**, treasurer of the **Miller Company**, becomes treasurer of the Splitdorf Corporation, and **Heney Lanahan**, general counsel of the Edison industries, becomes general counsel of the Splitdorf concern. By the new arrangement the Splitdorf finances come under control of the newly created finance committee. The committee will act in the same capacity for the **Splitdorf-Bethlehem Electrical Company**, the patent company of all Splitdorf interests.

Federal Judge Runyon has filed a memorandum granting a temporary injunction restraining the **Shamrock Manufacturing Company**, 158 Summit Avenue, from continuing alleged infringements of five radio patents held by the **Radio Corporation of America**, **General Electric Company**, **Westinghouse Electric and Manufacturing Company** and the **American Telephone and Telegraph Company**. No return date was fixed. The Radio Corporation of America is a licensee under the five patents and is authorized to sell for broadcast reception receiving sets manufactured under these patents. The Radio Corporation claims to have exclusive rights for these patents and no others may use them without its consent.

Newark concerns chartered during the past month were as follows: **Lincoln Electrical Supply Company**; \$50,000; manufacture electrical supplies. **Benson Metal Products and Roofing Co.**; \$100,000; manufacture sheet metal products.

**Zamite Company, Inc.**, \$100,000; manufacture chemicals. **Potts Company**; \$25,000; manufacture jewelry. **Splitdorf Roll-Iron Company**, 20,000 shares no par; manufacture electrical appliances. **Safety Signal Corporation of America**; 100 shares no par; manufacture safety signals. **Metal Castings Company, Inc.**; \$125,000; manufacture castings.

—C. A. L.

### Trenton, N. J.

DECEMBER 1, 1928.

Under direction of the **Trenton Chamber of Commerce**, an industrial survey of the city is being made. The information gathered as a result of this survey is expected to be valuable to the Chamber in putting before prospective manufacturers the advantages of the city as a place of location. It will also serve to assist manufacturing concerns already doing business here. Its purpose is to show the diversity of industries in Trenton and the reasons why they succeed. **Secretary Lochner** is being aided by information compiled by the State Department of Labor and Industries and the Bureau of the Census of the Department of Commerce and the Federal Labor Department.

Some of the metal manufacturing concerns of Trenton are running at normal capacity, while others announce that business is not up to expectations.

The **Sandow Brass Products Company, Inc.**, Jersey City, N. J., has been incorporated with \$300,000 of preferred stock and 25,000 shares common, no par, to manufacture brass goods of various kinds. The incorporators are William M. Stevens, Vincent W. Westrup and Samuel C. Wood, of New York. The new concern will shortly start operations.

Other concerns chartered here recently were: **Jersey Tin Manufacturing Company**, Jersey City; 1,000 shares; manufacture tin. **F. W. W. Manufacturing Company, Inc.**, Union city; \$125,000; manufacture lamps. **H. W. Ruhit, Inc.**, Plainfield; \$100,000; manufacture chemicals. **West Hudson Foundry Company, Inc.**, Kearny; \$100,000; foundry business. **Crown King Mines Corporation**, Montclair; \$25,000; deal in ores and minerals. **Elaterite Corporation of America**, Lyndhurst; 15,000 shares no par; manufacture chemicals. —C. A. L.

## Middle Western States

### Detroit, Mich.

DECEMBER 1, 1928.

**The Chromium Plating Corporation**, Ganson Street, Jackson, Mich., has been incorporated with a capital of \$25,000. The owners are George A. Barrow, L. Fred Bomhoff and Creighton Ryerson, all of Jackson.

The **Peerless Plating Plant** is a new concern incorporated at 522 East Fort Street, Detroit, with capital of \$25,000. It is engaged in general plating. The owners are Frank B.

Whitaker, Fay B. O'Camb and E. K. Wilson, it is stated.

**Aluminum Industries, Inc.**, Cincinnati, manufacturers of "Permit" pistons, recently opened general sales offices in the new Fisher building, Detroit, under the supervision of Arthur G. Eaton, recently elected vice-president of the corporation and appointed director of sales. A new type of aluminum piston will be presented to the automotive industry, it is stated, which is claimed to have all the favorable features of the best type of aluminum pistons.

**The New Life Company**, manufacturers of cleaners and polishers, has moved its production departments and offices from Ludington to Lansing. About 25 persons will be employed at first, according to **G. H. Rutt**, president.

**Kaine and Company**, 1900 East Jefferson avenue, Detroit, recently became a corporation. It manufactures polishing supplies. The capital stock is \$20,000.

**E. V. Allen**, owner and general manager of the **Evaco Industries**, 1329 Vernon Highway, East, announces that due to the increased demand for chromium plate it has been necessary for him to buy new equipment and to add 1,700 square feet of space to his plant. "Chromium plating is now out of the experimental stage and is being done on a large production basis," he says. "And this has been accomplished by applying practical methods to the application of the chromium, reducing the cost to a minimum. With our additional manufacturing space and new equipment, we are able to handle chromium plating on a large production basis and also to make special efforts for individual car owners." Mr. Allen is active in the American Electroplaters' Society and was instrumental in bringing the 1929 convention of the national body to Detroit. He has spent many years in the practical working of electro-deposition of metals and was one of the pioneers in chromium plating, overcoming the obstacles as they arose in the early stages of the business.

**The Marshall Blow Pipe Company**, Detroit, has developed an automatic continuous vertical forging furnace, it is announced. The new furnace operates automatically and continuously, handling such unwieldy parts as automobile rear axles, housings, etc. One furnace manufactured has been in daily use in one of Detroit's largest automobile plants for more than four months and to date not a single part produced by it has been rejected because of faulty heat treatment, it is claimed. Previous to this installation, heat treating rejections are said to have averaged more than 50 per cent. In many cases it makes possible the elimination of welding from manufacturing operations, it is stated.

**The old Capitol Brass Works**, now a division of the **Bohn Aluminum and Brass Corporation**, has recently installed a great amount of new equipment, entailing a cost of many thousands of dollars. This plant is operating at capacity and has every promise of being exceedingly busy all through the winter.

**The McCord Radiator Manufacturing Company** is now installing seven additional tanks, which will give it sufficient facilities for plating 2,000 radiator shells daily. It is expected to have the installation by December 1, when the increased production schedules go into effect.

**The Great Lakes Foundry Sand Company** recently moved its offices to 1356 New Penobscot Building, Detroit.

**The American Aluminum Metals and Piston Company**, 503 Lafayette Building, Detroit, was recently incorporated. The owners are William R. Bowers, Robert H. De Baptiste, and Robert E. Vincent, Detroit.

Business men at Grand Rapids recently organized a new \$100,000 metal working firm, to be known as the **National Moulding Company**. It will occupy the former plant of the **United Motors Company** and begins production on December 1 or thereabouts on a line of automobile and store equipment. Officers are: President, **R. W. Hook**, of the **Grand Rapids Metalcraft Corporation**; vice presidents, **W. W. Hoagland** and **A. A. Ginsberg**, of the **Hayes Body Corporation**; secretary, **S. W. Judd**; and treasurer, **H. W. Curtis**, of the **Kent State Bank**. **Dudley E. Waters**, of the **Grand Rapids National Bank**, is also one of the organizers.

**W. G. Hancock**, of the **McCord Radiator and Manufacturing Company**, Detroit, recently was elected to the board of directors of the **National Standard Parts Association**. The association, with membership of 366 manufacturers and jobbers in the motor car replacement industry, has its headquarters in the Eaton Tower, Detroit.

—F. J. H.

### Cleveland, Ohio

DECEMBER 1, 1928.

As the year approaches its end, production in the brass and plating industries is showing a tendency to slow up. Much of this is due, no doubt, to inventory preparation. This tendency usually is noticeable at this season of the year and does not indicate anything serious from a business stand-

point. If anything, it is a forerunner of still greater activity after the beginning of the new year.

The motor car accessory industry is holding up remarkably well and while it shows just now a tendency to sag somewhat, renewed activity is expected later on. Indications are that the winter months will bring better business than ever before. There seems every reason to believe the motor car industry will hold its own for a long time to come.

Approximately one-sixth of the new factory for the **Alliance Aircraft Corporation** at Alliance, O., is now under roof. According to present plans it will be completed this month.

Representatives of the **McCaskey Register Company** on their return to Alliance, O., from many parts of the country, paint glowing pictures for the immediate future of business. One of the best years in the history of the business is expected by all of them.

—F. J. H.

### Toledo, Ohio

DECEMBER 1, 1928.

No change of consequence has taken place in the metal or plating industries in this territory during the past month. Like the other cities of the Great Lakes, the motor car industry, which has been so promising all during the summer and fall is still having a steady effect, although just at present there seem to be indications of a slow-up, due, of course, to the approach of the annual inventory period.

The plating business has held its own for a long time and has every prospect of continuing that way. Toledo has so many varied industries in which plating is a factor that this phase of business is seldom in an entirely depressed condition.

The motor car and accessory plants are all anticipating greater activity directly after the first of the year than they have experienced during the last few weeks. In general, the outlook is favorable for the remainder of the fall and through the winter.

—F. J. H.

### Chicago, Ill.

DECEMBER 1, 1928.

**The Chicago Metal Spinning Company**, has had plans drawn for the erection of a two-story factory at 1715 Walnut Street. A special feature of the proposed plant will be the insulation of walls and ceilings and the use of a temperature control system in each unit to maintain an even heat and so allow greater accuracy in the metal work.

The factory of the **People's Iron and Metal Company**, 5835 Loomis Boulevard, owned by **Max Patinkin**, was recently destroyed by fire. Damage was estimated at \$100,000.

**The Mulligan Corporation** has been incorporated at Chicago with a capital of 64,000 shares at non par value. The company deals in products and by-products of ores, metal and minerals. Incorporators are **R. I. Hurd**, **M. E. Burgess** and **C. B. O'Neil**.

**The Art Metal Works** recently reported for the nine months ended September 30, a net profit of \$606,587 after federal taxes and charges, equal after allowance for dividends on the convertible preference stock to \$5.02 a share on 110,000 common shares.

—A. P. N.

**The Chicago Association of Commerce** called a meeting on November 21, at noon, for discussion of the **Chicago Centennial Celebration**, to be held in 1933. Over 2,200 prominent Chicago business men attended and heard a number of speakers, including Vice-President Dawes, Senator Deneen, Samuel Insull, Rufus C. Dawes, who heads the celebration committee, and others.

### Wisconsin Notes

Definite action is expected to be taken shortly in the proposed erection of a rolling mill by the **American Metal Products Company**, Milwaukee, of which **C. J. Zaiser** is president. The company manufactures copper-aluminum alloy metals. The proposed addition will be of brick and steel and measure 50 x 120 feet.

Work is progressing favorably on the new seven story addition to plant No. 2 of the **Aluminum Goods Manufacturing Company**, at Manitowoc, Wis. The foundation for the new structure is expected to be completed within the next three months.

—A. P. N.

## Other Countries

### Birmingham, England

NOVEMBER 23, 1928.

Exports from the Birmingham district to the United States showed an increase of 7 per cent in the third quarter of this year, as compared with the same period of 1927. In a re-classification introduced by the Birmingham Consul, particulars will appear henceforth of several descriptions of goods about which exporters and importers alike will be glad to have information. These include plated ware and silver, the last quarter's exports of which were valued at \$92,084; tinned sheets, \$18,662; and brass ware, \$60,724.

The consumption of aluminum in Birmingham is steadily on the increase, especially in the form of sheets. Domestic hollowware is becoming more popular and cheapening in price. Competition from the Continent in the lighter ware is a factor to be considered by British makers, and in order to combat this, new developments in standardization have been thought out. The scheme, however, still awaits final approval. Aluminum is increasingly used for motor car work and electrical purposes, and for the latter is sometimes replacing copper, this change being regarded as economical in spite of the lower conductivity of the lighter materials.

The approach of Christmas has brought a marked improvement to the jewelry trade, many shops which have been comparatively idle now being at work. They expect to be active between now and the end of the year. The livelier tone is also due to some revival in the taste for jewelry. The preference is for articles of good quality, although a tremendous amount of cheap ware is made in this district, much of which is sold through the large chain stores. The latter are finding it quite as profitable to buy from the Birmingham works as to place their orders with the Continent. The Birmingham traders will for the first time be represented by a composite exhibit of about 100 firms at the London section of the British Industries Fair next February. Among the novelties of the trade is a new material

called "goldoid," an alloy corresponding very largely to rolled gold. The Birmingham makers of medals in gold, silver and enamel are also very busy.

The **Birmingham Guild, Limited**, which is renowned for its artistic work in metals, has just secured an order to supply the ornamental wrought iron gates for the Viceroy's court of the palatial Government House, New Delhi, India. It is worth £6,000 and is probably the largest contract for this type of ironwork that has been placed in this country for many years. The total weight of the gates is 54 tons.

A seasonal trade in cutlery is developing in the Sheffield district, although it is not on such a good scale as in some previous years since the war ended. It is believed, however, that the demand for expensive cabinets of cutlery and plate has been on the increase for some time and probably more has been sold this year than ever before. The Dominions and India have been good customers.

The manufacture of metal windows, much of which takes place in Birmingham, is a growing industry and a very good trade is being done for the ordinary dwelling house and large business premises in London and the provinces. Many advantages are claimed for the metal windows, including long life, cheapness of upkeep, and better lighting.

Chromium plating has become very popular and a large firm which recently installed a plant in Birmingham has already found it necessary to extend, chiefly on account of the demand from automobile makers. In connection with the use of stainless steel, an innovation is its adaptability for signalling on the railways. It has been found that a red or white light displayed on a stainless steel background shines out with great brilliancy and can be seen a long distance away.

The strong position of the copper market has led to increases in local prices, copper sheets having advanced from £96 to £98, seamless copper and brazed copper tubes by  $\frac{1}{4}$ d. per pound, and cold rolled brass tubes by the same amount.

—J. H.

## Business Items—Verified

**Royal Brass Manufacturing Company**, 1420 East 43rd Street, Cleveland, Ohio, is building a one-story addition.

**Precision Die Casting Company**, Syracuse, N. Y., has purchased property at Cleveland Ohio, where it will erect a branch plant to cost about \$100,000 with equipment.

**Progressive Brass Manufacturing Company** Tulsa, Okla., has moved to a larger plant at 1702-16 East Sixth Street. Formerly the firm was located at 917 East First Street.

**National Lead Company**, New York, plans construction of a 2-story lead plant at Gold and Marshall Streets, Brooklyn, N. Y. Plans have been drawn and contract is to be awarded shortly.

**Dallas Brass and Copper Company**, 820 Orleans Street, Chicago, Ill., has purchased a tract of land adjacent to its plant on Grand Avenue. The area will be used for expansion when necessary.

**J. I. Thomas**, Lewiston, Pa., sheet metal contractor, has moved into new and much larger quarters at West Charles Street. The firm produces light and heavy sheet metal work of all kinds, metal roofing, etc.

**United States Stamping Company**, Moundsville, W. Va., large manufacturers of kitchen ware recently placed contract with **The Ferro Enamel Supply Company**, Cleveland, Ohio, for a continuous porcelain enameling furnace.

**Altorfer Brothers Company**, East Peoria, Ill., washing machine manufacturers, are building an addition 100 x 600 feet in area, to provide for larger manufacturing capacity. Floor space will be increased about 30 per cent.

**Super-Maid Aluminum Ware Company, Inc.**, Chicago, Ill., has purchased the plant of the **Roseland Can and Wire Goods Company**, 612 Harrison Avenue, Rockford Ill. The company has a foundry and two factories in Chicago.

**National Tinsel Manufacturing Company**, Manitowoc, Wis., has awarded a contract for a plant addition of 3 stories,

50 x 150 feet, according to **W. C. Protz**, president. Company operates plating, wire drawing and Sherardizing departments.

**Enterprise Manufacturing Company**, Cambridge, Mass., manufacturers of hot water boilers, copper tanks, etc., has removed its plant to Third and Binney Streets, where it will occupy the former Blake and Knowles Pump Company quarters. This will permit increased production.

**Hobson Flatware Company**, Lansdale, Pa., producers of chromium and nickel plated ware, plans construction of a new plant at Lambertville, N. J., to cost over \$75,000 with equipment. It is planned to remove the company to the new location, where production will be materially increased.

**Sangamo Electric Company of Canada, Ltd.**, 183 George Street, Toronto, Ont., will proceed at once on construction of a 2-story addition, 40 x 110 feet to care for increased production. Company has plating, grinding, japanning, brass machine shop, and casting shop departments.

**Botfield Refractories Company**, Philadelphia, Pa., manufacturers of fire brick cement, refractory mixtures and refractory cement guns announces that **The Marshall Supply Company, Incorporated**, operating in Pittsburgh, Kansas and Tulsa, Oklahoma, have been appointed distributors of all their products.

**Lewis Manufacturing and Supply Company**, Louisville, Ky., kitchen equipment manufacturers, will occupy a new plant now under construction at Brook and Bloom Streets. The factory will cost about \$30,000. Company operates cutting-up, tinning, soldering, polishing, grinding and lacquering departments.

**Rome Electric Range Company**, Huntsville, Ala., is building a plant of one story, 50 x 250 feet, which will include foundry and machine shop, plating, brazing, polishing, japanning and other departments according to **C. R. Porter**, president. The company is interested in purchasing sheet metal and other raw materials.

**The U. S. Stoneware Company**, operating three plants for the manufacture of acid proof chemical stoneware at Akron and Tallmadge, Ohio, have just appointed the **Western Precipitation Company**, of 1016 West Ninth Street, Los Angeles, Calif., as district sales representatives in Southern California and Arizona.

**Koepen Metal Products, Inc.**, has moved to Carstadt, N. J., from its former location at Union City, N. J. The company operates a brass machine shop, spinning and plating rooms, and grinding, stamping and lacquering rooms. It produces a line of pure nickel kitchenware, patent grinding and polishing machines and other products.

**Doehler Die Casting Company**, Batavia, N. Y., has purchased the Metal Mold Castings Company, Winchester Avenue, Buffalo, N. Y., and will remove production to Batavia early in 1929. The Doehler company plans to use metal mold processes for casting heavy aluminum parts in its Batavia plant, where production is to be enlarged.

**Wilson-Maeulen Company Inc.**, 383 Concord Avenue, New York, is building a 4-story concrete extension to its plant. Increased space will permit expansion of four departments, machine shop, assembly, office and research. The company manufactures recording, controlling and indicating pyrometers, the Rockwell hardness tester etc. **Charles H. Wilson** is president.

**Barbour Stockwell Company**, Cambridge Mass., is under

full production in its new foundry, casting brass, bronze, aluminum and iron. It is housed in a new brick building, 40 x 60 feet, with overhead traveling crane. This building also houses cleaning department, stockroom and washroom. Capacity is about 3 tons of brass a day. Some machinery is still to be installed, but most of it is already in.

**The Kirk and Blum Manufacturing Company**, Cincinnati, Ohio, makers of dust collecting apparatus, sheet metal products, etc., are opening a branch factory with sales and engineering office at 4718 Burlingame, near Broad street, Detroit, Michigan. The purpose of this plant will be to extend more prompt and efficient service to the automotive and other industries in Detroit and vicinity than has heretofore been possible through shipping materials from the Cincinnati plant. This will also mean the removal of the present district office at 3-128 General Motors Building.

**Chromium Plating Corporation**, 2307 East Ganson Street, Jackson, Mich., has been established by George A. Barrow, L. F. Bomhoff and C. W. Ryerson, and is operating a plant. Mr. Barrow, one of the organizers, is well known in plating circles, having formerly been in charge of the plating department of the Jackson Steel Products Company, of the same city. The firm is operating steadily, depositing chromium on a large variety of articles, including automobile parts, instruments, tools, etc. It is said to be one of the largest such concerns in the middle west.

## Review of the Wrought Metal Business

By **J. J. WHITEHEAD**,  
President, Whitehead Metal Products Company of New York, Inc.

WRITTEN ESPECIALLY FOR THE METAL INDUSTRY

DECEMBER 1, 1928.

There seems to be no slackening in the pace at which the fabricated brass and copper business has been running for the past sixty days. The mills are running at full speed and are unable to keep up with orders. As a result deliveries are becoming increasingly difficult to obtain with six to eight weeks' time required for some products. The entire business is going forward at a tremendous rate.

The building trade continues to consume immense quantities of brass pipe and sheet copper and deliveries on these products are becoming increasingly difficult to obtain. Copper wire manufacturers are reported to have reached a point where they are refusing orders for nearby deliveries with the result that consumers of wire are having trouble getting sufficient supply. Practically all lines using brass and copper are in prosperous condition and each is adding an unusual quota to swell the enormous demand.

Many rumors are in the air concerning various consolidations involving almost all of the independent mills produc-

ing brass and copper sheets, rods, tubes or wire. Some of the large mining companies are reported to be conducting negotiations with various plants looking to their purchase and consolidation into a group of mills similar to the American Brass-Anaconda merger. Whatever of truth there may be in these rumors, it is generally accepted that it is only a matter of time when some consolidations will be made with the result that the fabrication of brass and copper will probably be concentrated in three strong groups.

Orders for nickel and Monel metal broke all records for volume in November. The development of these lines for the past year has been quite in harmony with the general growth of the entire ferrous metal industry so that at this time deliveries of nickel are extremely difficult to get and all facilities for producing monel metal are in production.

Inasmuch as there is no indication as yet of any recessions of demand the producers of all non-ferrous metals are predicting that unless some unexpected upheaval occurs in general conditions, they will be busy for the first half of 1929.

## Metal Market Review

By **R. J. HOUSTON**,  
D. Houston and Company, Metal Brokers, New York

WRITTEN ESPECIALLY FOR THE METAL INDUSTRY

### Copper

DECEMBER 1, 1928.

The market for copper has been notably strong for many weeks, but despite the urgency of consumer demand prices continue to quote 16 cents Connecticut Valley delivery and 16½ cents c. i. f. European ports. November sales were in good volume, although new business was not so heavy as it was in September and October. The market could easily display more aggressive action, but present levels have been maintained notwithstanding the unprecedented movement of the metal into consumption.

Domestic deliveries are now at a record-breaking rate. October proved the most active month in point of shipments to the home trade.

All sections of the country show great activity among the fabricators of copper. Mill operation at the brass and copper

plants is kept up at a continuously high rate owing to increased use of copper by electrical equipment manufacturers, automobile makers and the building trade. Market closed firm at 16 cents delivered to Connecticut Valley points and 16½ cents c. i. f. European ports.

### Zinc

During the month just ended the market for zinc has registered an unchanged price situation on the basis of 6.25c at East St. Louis and 6.60c at New York. A hand-to-mouth buying policy prevailed over a considerable period, but a distinct change for the better was apparent lately which has tended toward business of larger dimensions. Near the month end there was active buying for both early and forward positions. Consumers came in the market for round tonnages, and the situation took on a brighter

appearance and a more favorable outlook. Interest has developed for first quarter 1929 shipment.

### Tin

After a period of declining prices the tin market developed a firmer tone lately and decided activity. Strong advices from London and heavy buying by prominent operators abroad were factors in advancing prices for all positions. Large transactions also took place in the local market which infused fresh life into the situation. Consumers and dealers bought on a liberal scale in the later half of the month as prices advanced. Spot and nearby delivery sold at 52½c to 53½c, and sales were made of all positions up to May, with 51½c paid for May delivery. These prices compared with 49¾c for prompt straits on November 1. The market is stronger as this report closes, with December Straits quoting 53 cents per pound.

### Aluminiun

Aluminum prices are holding steady at 24.50c for 99% plus and 23.90c for 98.99% plus. There has been no recent change, and producers are getting plenty of new business at current levels. Automotive manufacturers and other industries are maintaining a high rate of consumption.

### Antimony

The recent volume of business in antimony was only fair, with variable market conditions. Generally speaking Chinese holders were firm, but demand was not active enough to inspire confidence to any marked degree. The market lost ground during the past month, and all positions were practically obtainable at the same price level. The more recent developments show that both spot and forward deliveries of Chinese regulus were easy at 10c to 10.10 per pound duty paid. These quotations compare with 10½c to 10½c a short time ago.

### Lead

Urgent demand for lead was in evidence during the closing days of November, and the buying developed into orders for a heavy tonnage covering December and January shipments. The appearance of large consuming requirements gave the impression of decided underlying market strength. The principal producers are

holding very firm, and indications are that domestic consumption is expanding. In fact, business has been declined for balance of this year, and interest is now centered on the January position. Conditions are in a satisfactory state and recent extensive buying reflects confidence in the situation. Prices are firm at 6.20c to 6.22½c East St. Louis and 6.35c New York. Market tone firm and liable to display increased strength.

### Quicksilver

New business has been on a fair scale, but consuming demand is not broad enough to stiffen the market. Recent foreign quotations were slightly lower and buyers' views in the local market were below asking prices of \$124.50 to \$126 per flask.

### Platinum

Refined platinum quotes \$72.50 per ounce. Demand has been within ordinary dimensions, and there are no unusual developments.

### Silver

Movements in silver as a whole have had little effect on prices lately. China and India have bought some, but the quota of orders from the Far East were not sufficiently important to constitute a strong factor. In view of the recent limited offerings and narrow price fluctuations it looks as if silver is well stabilized around present levels. New York price of silver at this writing quotes 57½ cents per ounce.

### Old Metals

Continued buying interest for copper and brass scrap has strengthened the market for these grades. Domestic consumers are taking the bulk of offerings as foreign buyers are not so keen to pay ruling prices for selected material. The home outlet, however, is in position to absorb most of the supplies obtainable. New brass clippings and other brass material have found ready sale. A better demand is also noted for the aluminum grades. Lead scrap was rather dull lately and sales were on a limited scale. Bid prices by dealers in old metal were 13½c to 13¾c for selected crucible copper, 11½c to 11¾c for light copper, 7¾c to 8c for heavy brass, 6½c to 6¾c for light brass, 10½c to 10¾c for new brass clippings, 5c to 5½c for heavy lead, and 16¾c to 17c for aluminum clippings.

## Daily Metal Prices for the Month of November, 1928

### Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	2	5	6	7	8	9	12	13	14	15	16	19
<b>Copper c/lb. Duty Free</b>													
Lake (Delivered) .....	16.125	16.125	16.125		16.125	16.125	16.125	16.125	16.125	16.125	16.125	16.125	16.125
Electrolytic (f. a. s. N. Y.) .....	16.125	16.125	16.125		16.125	16.125	16.00	16.125	16.125	16.125	16.125	16.125	16.125
Casting (f. o. b. N. Y.) .....	15.625	15.625	15.625		15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.75	15.75
<b>Zinc (f. o. b. St. L.) c/lb. Duty 1¾c/lb.</b>													
Prime Western.....	6.25	6.25	6.25		6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Brass Special.....	6.35	6.35	6.35		6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35
<b>Tin (f. o. b. N. Y.) c/lb. Duty Free</b>													
Straits.....	49.75	49.75	49.25		49.75	49.875	49.75	50.00	50.00	50.125	50.125	50.25	50.50
Pig 99%.....	49.375	49.375	48.875		49.375	49.50	49.375	49.625	49.625	49.50	49.50	49.625	49.875
<b>Lead (f. o. b. St. L.) c/lb. Duty 2½c/lb.</b>													
6.325	6.325	6.325			6.325	6.325	6.25	6.20	6.20	6.20	6.20	6.175	6.175
<b>Aluminum c/lb. Duty 5c/lb.</b>													
24.30	24.30	24.30			24.30	24.30	24.30	24.30	24.30	24.30	24.30	24.30	24.30
<b>Nickel c/lb. Duty 3c/lb.</b>													
Ingot.....	35	35	35		35	35	35	35	35	35	35	35	35
Shot.....	36	36	36		36	36	36	36	36	36	36	36	36
Electrolytic.....	37	37	37		37	37	37	37	37	37	37	37	37
<b>Antimony (J. &amp; Ch.) c/lb. Duty 2c/lb.</b>													
10.375	10.375	10.375			10.25	10.25	10.25	10.375	10.375	10.375	10.00	10.125	10.25
<b>Silver c/oz. Troy Duty Free.</b>													
57.625	58.00	58.00			57.75	57.875	57.875	58.25	58.125	58.00	58.00	58.00	58.00
<b>Platinum \$/oz. Troy Duty Free.</b>													
75.00	75.00	75.00			75.00	75.00	75.00	72.50	72.50	72.50	72.50	72.50	72.50
	20	21	22	23	26	27	28	*29	30	High	Low	Aver.	
<b>Copper c/lb. Duty Free</b>													
Lake (Delivered) .....	16.125	16.125	16.125	16.125	16.125	16.125	16.125		16.125	16.125	16.125	16.125	
Electrolytic (f. a. s. N. Y.) .....	16.125	16.125	16.125	16.125	16.125	16.125	16.125		16.125	16.125	16.125	16.125	
Casting (f. o. b. N. Y.) .....	15.75	15.75	15.75	15.75	15.75	15.75	15.75		15.75	15.75	15.75	15.75	
<b>Zinc (f. o. b. St. L.) c/lb. Duty 1¾c/lb.</b>													
Prime Western.....	6.25	6.25	6.25	6.25	6.35	6.35	6.35		6.35	6.35	6.25	6.25	
Brass Special.....	6.35	6.35	6.35	6.35	6.45	6.45	6.45		6.45	6.45	6.35	6.35	
<b>Tin (f. o. b. N. Y.) c/lb. Duty Free</b>													
Straits.....	51.25	51.625	51.25	52.25	53.00	52.75	52.75		53.00	53.00	49.25	50.85	
Pig 99%.....	50.50	50.875	50.50	51.50	52.25	52.00	52.00		52.25	52.25	48.875	50.275	
<b>Lead (f. o. b. St. L.) c/lb. Duty 2½c/lb.</b>													
6.175	6.175	6.20	6.20	6.20	6.225	6.225	6.225		6.25	6.325	6.175	6.234	
<b>Aluminum c/lb. Duty 5c/lb.</b>													
24.30	24.30	24.30	24.30	24.30	24.30	24.30	24.30		24.30	24.30	24.30	24.30	
<b>Nickel c/lb. Duty 3c/lb.</b>													
Ingot.....	35	35	35	35	35	35	35		35	35	35	35	
Shot.....	36	36	36	36	36	36	36		36	36	36	36	
Electrolytic.....	37	37	37	37	37	37	37		37	37	37	37	
<b>Antimony (J. &amp; Ch.) c/lb. Duty 2c/lb.</b>													
10.125	10.125	10.125	10.10	10.00	10.125	10.00	10.00		10.00	10.375	10.00	10.199	
<b>Silver c/oz. Troy Duty Free.</b>													
58.00	57.875	58.00	58.00	57.875	58.00	57.875	57.875		57.75	58.25	57.625	57.944	
<b>Platinum \$/oz. Troy Duty Free.</b>													
72.50	72.50	72.50	72.50	72.50	72.50	72.50	72.50		72.50	75.00	72.50	73.375	

\* Holiday.

# Metal Prices, December 3, 1928

## NEW METALS

Copper: Lake, 16.125. Electrolytic, 16.125. Casting, 15.75.  
 Zinc: Prime Western, 6.35. Brass Special, 6.45.  
 Tin: Straits, 53.25. Pig, 99%, 52.50.  
 Lead: 6.325. Aluminum, 24.30. Antimony, 10.00.

Nickel: Ingot, 35. Shot, 36. Elec., 37. Pellets, 40.  
 Quicksilver: flask, 75 lbs., \$125. Bismuth, \$1.70.  
 Cadmium, 95. Cobalt, 97%, \$2.60. Silver, oz., Troy, 57.75.  
 Gold: oz., Troy, \$20.67. Platinum, oz., Troy, \$72.50.

## INGOT METALS AND ALLOYS

Brass Ingots, Yellow.....	11½ to 12
Brass Ingots, Red.....	14½ to 14¾
Bronze Ingots .....	16 to 18½
Casting Aluminum Alloys.....	21 to 24
Manganese Bronze Castings.....	24 to 40
Manganese Bronze Ingots.....	13½ to 17½
Manganese Bronze Forging .....	32 to 42
Manganese Copper, 30% .....	25 to 35
Monel Metal Shot .....	28
Monel Metal Blocks .....	28
Parsons Manganese Bronze Ingots.....	16½ to 19¾
Phosphor Bronze .....	14 to 16
Phosphor Copper, guaranteed 15%.....	18 to 21
Phosphor Copper, guaranteed 10%.....	17 to 20
Phosphor Tin, no guarantee .....	60 to 70
Silicon Copper, 10%, according to quantity.....	28 to 32

## OLD METALS

Buying Prices	Selling Prices
13½ to 13¾ Heavy Cut Copper .....	14½ to 14¾
12¾ to 13 Copper Wire, mixed .....	14 to 14½
11 to 11½ Light Copper .....	12 to 12½
10½ to 10¾ Heavy Machine Composition .....	12 to 12½
7¾ to 8 Heavy Brass .....	9½ to 9½
6½ to 6¾ Light Brass .....	8 to 8½
7¾ to 8 No. 1 Yellow Brass Turnings .....	9½ to 9½
9¾ to 10 No. 1 Composition Turnings .....	10¾ to 11
5½ to 5¾ Heavy Lead .....	6¾ to 7
3½ to 3¾ Zinc Scrap .....	4¾ to 5½
8 to 10 Scrap Aluminum Turnings .....	12½ to 14½
13 to 13½ Scrap Aluminum, cast alloyed .....	17½ to 18½
19 to 20 Scrap Aluminum sheet (new) .....	22 to 22½
35 to 37 No. 1 Pewter .....	41½ to 43½
17 Old Nickel Anodes .....	19
17½ Old Nickel .....	19½

## Wrought Metals and Alloys

### COPPER SHEETS

Mill shipment (hot rolled).....	.25c. to .26c. net base
From stock .....	.26c. to .27c. net base

### BARE COPPER WIRE

17½c. to 17¾c., net base, in carload lots.

### COPPER SEAMLESS TUBING

26½c. to 27¾c. net base.

### SOLDERING COPERS

300 lbs. and over in one order.....	.23½c. net base
100 lbs. to 200 lbs. in one order.....	.24c. net base

### ZINC SHEET

Duty sheet, 15% Carload lots, standard sizes and gauges, at mill, less 8 per cent discount .....	Cents per lb. 9.75 net base
Casks, jobbers' price .....	10.25 net base
Open casks, jobbers' price .....	10.75 to 11.25 net base

### ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga., base price, ton lots.....	.33.30c.
Aluminum coils, 24 ga., base price, ton lots.....	.31.00c.

### ROLLED NICKEL SHEET AND ROD

Net Base Prices			
Cold Drawn Rods.....	53c.	Cold Rolled Sheet.....	60c.
Hot Rolled Rods.....	45c.	Full Finished Sheet.....	52c.

### BLOCK TIN SHEET

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 10½c. over Pig Tin; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 17c. over; less than 25 lbs., 25c. over.

### SILVER SHEET

Rolled sterling silver 59c. to 61c. per ounce, Troy.

### BRASS MATERIAL—MILL SHIPMENTS

In effect May 25, 1928

To customers who buy 5,000 lbs. or more in one order.

	Net base per lb.
Sheet .....	\$0.20½
Wire .....	.21
Rod .....	.18½
Brazed tubing .....	.28½
Open seam tubing .....	.28½
Angles and channels .....	.31½

### BRASS SEAMLESS TUBING

25½c. to 26½c. net base.

Tobin Bronze Rod .....	22½c. net base
Muntz or Yellow Metal Sheathing (14"x48")....	20½c. net base
Muntz or Yellow Rectangular sheet other Sheathing .....	21½c. net base
Muntz or Yellow Metal Rod .....	18½c. net base
Above are for 100 lbs. or more in one order.	

### NICKEL SILVER (NICKELENE)

Grade "A" Sheet Metal	Net Base Prices	Wire and Rod	
10% Quality .....	28.25c.	10% Quality .....	31.25c.
15% Quality .....	29.75c.	15% Quality .....	35.00c.
18% Quality .....	31.00c.	18% Quality .....	38.25c.

### MONEL METAL, SHEET AND ROD

Hot Rolled Rods (base) .....	35	Full Finished Sheets (base) .....	42
Cold Drawn Rods (base) .....	40	Cold Rolled Sheets (base) .....	50

### BRITANNIA METAL SHEET

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin price; 100 lbs. to 500 lbs., 10c. over; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over. Prices f. o. b. mill.

# Supply Prices, December 3, 1928

## ANODES

<b>Copper:</b> Cast	23c. per lb.	<b>Nickel:</b> 90-92%	45c. per lb.
Rolled, oval	23½c. per lb.	95-97%	47c. per lb.
Rolled, sheets, trimmed	24½c. per lb.	99%	49c. per lb.
<b>Brass:</b> Cast	24c. per lb.		
<b>Zinc:</b> Cast	12½c. per lb.		

**Silver:** Rolled silver anodes .999 fine are quoted from 61c. to 63c., Troy ounce, depending upon quantity.

## FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 100 lbs.	100 to 200 lbs.	Over 200 lbs.
10-12-14 & 16"	1" to 3"	\$3.00/lb.	\$2.75/lb.	\$2.65/lb.
6-8 & Over 16	1 to 3	3.10	2.85	2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 up to 6	¼ to 3	4.85	4.85	4.85
4 up to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

Grey Mexican Wheel deduct 10c per lb. from White Spanish prices.

## COTTON BUFFS

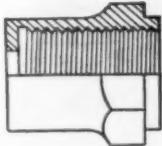
Full Disc Open buffs, per 100 sections.		
12" 20 ply 64/68 Unbleached		\$29.65
14" 20 ply 64/68 Unbleached		38.20
12" 20 ply 80/92 Unbleached		32.45
14" 20 ply 80/92 Unbleached		44.00
12" 20 ply 84/92 Unbleached		42.50
14" 20 ply 84/92 Unbleached		57.60
12" 20 ply 80/84 Unbleached		38.35
14" 20 ply 80/84 Unbleached		52.00
Sewed Pieced Buffs, per lb., bleached		45-70c.

## CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	.lb.	.14-19	Iron Sulphate (Copperas), bbl.	.lb.	.01½
Acid—Boric (Boracic) Crystals	.lb.	.08½	Lead Acetate (Sugar of Lead)	.lb.	.13½
Chromic, 75 and 125 lb. drums	.lb.	.20½-21	Yellow Oxide (Litharge)	.lb.	.12½
Hydrochloric (Muriatic) Tech., 20°, Carboys	.lb.	.02	Mercury Bichloride (Corrosive Sublimate)	.lb.	\$1.58
Hydrochloric, C. P., 20 deg., carboys	.lb.	.06	Nickel—Carbonate, dry, bbls.	.lb.	.29
Hydrofluoric, 30%, bbls.	.lb.	.08	Chloride, bbls.	.lb.	.18
Nitric, 36 deg., carboys	.lb.	.06	Salts, single, 300 lb. bbls.	.lb.	.10½
Nitric, 42 deg., carboys	.lb.	.07	Salts, double, 425 lb. bbls.	.lb.	.10
Sulphuric, 66 deg., carboys	.lb.	.02	Paraffin	.lb.	.05-06
Alcohol—Butyl	.lb.	.17½-22½	Phosphorus—Duty free, according to quantity	.lb.	.35-40
Denatured, drums	gal.	.48-56	Potash, Caustic Electrolytic 88-92% broken, drums	.lb.	.09
Alum—Lump, Barrels	.lb.	.03½	Potassium Bichromate, casks (crystals)	.lb.	.09
Powdered, Barrels	.lb.	.039	Carbonate, 96-98%	.lb.	.06½-07
Aluminum sulphate, commercial tech.	.lb.	.02½	Cyanide, 165 lb. cases, 94-96%	.lb.	.57½
Aluminum chloride, solution in carboys	.lb.	.06½	Pumice, ground, bbls.	.lb.	.02½
Ammonium—Sulphate, tech., bbls.	.lb.	.03½	Quartz, powdered	ton	\$30.00
Sulphocyanide	.lb.	.65	Rosin, bbls.	.lb.	.04½
Arsenic, white, kegs	.lb.	.05	Rouge, nickel, 100 lb. lots	.lb.	.25
Asphaltum	.lb.	.35	Silver and Gold	.lb.	.65
Benzol, pure	gal.	.60	Sal Ammoniac (Ammonium Chloride) in casks	.lb.	.05½
Borax Crystals (Sodium Borate), bbls.	.lb.	.04½	Silver Chloride, dry, 100 oz. lots	oz.	.46½
Calcium Carbonate (Precipitated Chalk)	.lb.	.04	Cyanide (fluctuating)	oz.	.57-60
Carbon Bisulphide, Drums	.lb.	.06	Nitrate, 100 ounce lots	oz.	.40
Chrome Green, bbls.	.lb.	.28	Soda Ash, 58%, bbls.	.lb.	.02½
Chromic Sulphate	.lb.	.37	Sodium—Cyanide, 96 to 98%, 100 lbs.	.lb.	.19
Copper—Acetate (Verdigris)	.lb.	.23	Hyposulphite, kegs	.lb.	.04
Carbonate, bbls.	.lb.	.16½-17	Nitrate, tech., bbls.	.lb.	.04½
Cyanide (100 lb. kegs)	.lb.	.50	Phosphate, tech., bbls.	.lb.	.03½
Sulphate, bbls.	.lb.	.06½	Silicate (Water Glass), bbls.	.lb.	.02
Cream of Tartar Crystals (Potassium Bitartrate)	.lb.	.27	Sulpho Cyanide	.lb.	.32½
Crocus	.lb.	.15	Sulphur (Brimstone), bbls.	.lb.	.02
Dextrin	.lb.	.05-08	Tin Chloride, 100 lb. kegs	.lb.	.39
Emery Flour	.lb.	.06	Tripoli, Powdered	.lb.	.03
Flint, powdered	ton	\$30.00	Wax—Bees, white, ref. bleached	.lb.	.60
Fluor-spar (Calcic fluoride)	ton	\$70.00	Yellow, No. 1	.lb.	.45
Fusel Oil	gal.	\$4.45	Whiting, Bolted	.lb.	.02½-06
Gold Chloride	oz.	\$14.00	Zinc, Carbonate, bbls.	.lb.	.11
Gum—Sandarac	.lb.	.26	Chloride, casks	.lb.	.06½
Shellac	.lb.	.59-61	Cyanide (100 lb. kegs)	.lb.	.41
			Sulphate, bbls.	.lb.	.03½

# Manufacturer reduces production costs 38%\* by using Free-Turning ANACONDA BRASS RODS



Retaining-nut machined from Anaconda Hexagonal Free-Turning Brass Rod. The net cost was 38% less than if steel had been used.

\* From a survey by A. C. Nielsen Co.—8-31-27

A Wisconsin manufacturer has adopted brass as a standard metal for making screw machine products. Steel serves the functional requirements of these products equally well in many cases, but it was found that the workability of Anaconda Brass resulted in a cost advantage when total costs were considered.

The retaining-nut illustrated is a typical example of the saving made possible by using brass. A cost comparison between steel and brass for this piece indicates a saving of 38.2% in favor of Anaconda Brass. The following table gives the cost figures in detail:

	Brass	Steel
Production per hour	250	22
Material cost per M	\$24.34	\$ 8.01
Labor, machine and tool costs per M	3.65	37.87
Total cost per M	27.99	45.28

Cost reduction through the use of Anaconda hexagonal Brass Rod: \$17.29 per M, or 38.2%.

It may be that you too can cut costs and increase production through the use of Anaconda Free-Turning Brass Rods. A study of comparative estimates for any part that may now be made of steel will, in many cases, particularly where a large amount of scrap is removed, be surprisingly favorable to the use of Anaconda Brass Rods.

#### THE AMERICAN BRASS COMPANY

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New Toronto, Ontario

# ANACONDA COPPER BRASS

There is usually one best metal for every manufacturing requirement.

The American Brass Company's Technical Department is prepared to help determine what this metal is and if the need can be met most advantageously with copper or an alloy of copper, to supply the metal in uniform, dependable quality.

## Brass : - : Bronze : - : Copper Nickel Silver

IN SHEET, ROLLS, WIRE, ROD AND TUBE. ARCHITECTURAL BRONZE, ANGLES AND CHANNELS, PHOSPHOR BRONZE, NAVAL BRONZE, BUS BAR COPPER, SOLDERING COPPERS, SCREEN CLOTH AND WIRE MESH. COPPER RIVETS AND BURS, COPPER NAILS, ESCUTCHEON PINS, BRASS PIPE FITTINGS, ETC.

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CLEVELAND - CHICAGO - DETROIT

Manufacturers of  
**NICKEL SILVER, BRONZE  
GILDING METAL**

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IN SHEET and ROLLS

**WATERBURY ROLLING MILLS, Inc.**  
WATERBURY, CONN.

We Solicit Your Inquiry

### **Hendricks Brothers**

INCORPORATED

#### **SHEET AND BAR COPPER**

**Copper Fire Box Plates—Stay Bolts,  
Braziers' Rivets**

**INGOT COPPER, BLOCK TIN  
Slab Zinc—Lead—Antimony—Bismuth and Nickel**

**49 CLIFF STREET, NEW YORK**

**Sheet Brass, Brass Rod,  
Brass Wire, Brazed  
Tubing  
Extruded Metal Shapes**

**THE BRISTOL BRASS  
CORPORATION**

**BRISTOL - CONNECTICUT**

Established 1850

### **AMERICAN NICKELOID Co.**

**PERU, ILLINOIS**

ESTABLISHED 1898

Manufacturers of

**NICKELOID**  
(coils, sheets, circles)

Works:  
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Walnutport, Pa.

Sales Offices: 70 N. 6th St.  
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## **Copper, Brass, Aluminum and Other Metal Rolling Mills**

### **MANUFACTURERS OF PLATE, SHEET, ROD, WIRE, TUBE, INGOT, METAL GOODS**

#### **NON-CORROSIVE FINEST QUALITY COPPER and YELLOW**

(Muntz) Metal, Naval Brass, Naval Bronze, Manganese Bronze, Plates, Sheets, Bolts, Bars, Rods, Nails, Tacks, etc.

Taunton-New Bedford Copper Co.  
NEW BEDFORD, MASS.  
New York: 35 Howard St. Boston: 61 Batterymarch St.

#### **Seamless Brass and Copper TUBES**

Small Sizes—Light Gauges

Penn Brass & Copper Co., Inc.  
Manufacturers "Superior" Brand Tubes  
1120-30 W. 18th St. Erie, Pa.

**A CARD IN THIS  
DIRECTORY  
WILL BENEFIT YOUR BUSINESS**

Brass, Bronze, Copper, Nickel Silver, Zinc  
Fuse Strip in

#### **Thin Gauges**

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Sterling Silver  
**FIRELESS SILVER SOLDERS**  
John J. Jackson Company  
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#### **ALUMINUM** Rod—SHEET—Wire

Moulding, Bar, Rivets, Tubing, Ingot, Matting,  
Immediate Shipment from Stock.

STRAHS ALUMINUM CO.  
48 FRANKLIN ST. NEW YORK

### Professional

Have you a PROBLEM in White Gold or  
Platinum for instance?

Bring your troubles to us

**LUCIUS PITKIN INC.**

Chemists and Metallurgists

47 Fulton St. New York, N. Y.  
We sell Mond Nickel Fines Pellets

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Analyses—Physical Tests—Microscopical Examinations  
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Practice—Assayers for Ricketts & Company, Inc.  
—Technical Advice on Chromium Plating.

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NEW YORK

Phone—Bowling Green 7016

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Address

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Member of the Audit Bureau of Circulations

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PRODUCERS OF PIG LEAD, SLAB ZINC, ZINC ROD, SHEET ZINC, ACIDS

### **ANACONDA ELECTROLYTIC ZINC**

99.9% PURE

### **PIG LEAD**

I. L. R. CO.

E. M. CO.

Sales Agents

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25 BROADWAY, NEW YORK

### **HEGELER ZINC COMPANY**

DANVILLE, ILLINOIS

Manufacturers of  
Rolled Zinc-Strips and Coils.

Boiler Plates

Slab Zinc

Sulphuric Acid



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WESTERN SALES OFFICE  
715 N. Y. Life Building  
39 So. La Salle St.  
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### **Publicity and Prestige**

assure

### **SUCCESS**

The use of this space will  
give you the first essential

### **ILLINOIS ZINC COMPANY**

PERU, ILLINOIS

Manufacturers of  
Sheet and Ribbon Zinc, Slab Zinc,  
Corrugated Zinc Sheets for Roofing

Sales Offices  
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Chicago, Ill.

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New York, N. Y.

**STRIP ZINC**  
For Drawing and Stamping Fuse Metal  
**THE PLATT BROS. & CO.**  
WATERBURY, CONN.

# DIRECTORY

## Metal Smelters, Refiners, Dealers

PRODUCERS, ALSO BUYERS AND SELLERS OF NEW AND OLD METALS

Have you a Factory Dump containing Brass Buffing Ashes, Metal Scale, Tank Sediments, Sweepings, Ashes, Tailings or other extremely low metal content refuse?

We pay cash per ton or per lot for such material.

We maintain crews of men and special equipment to handle and load anywhere under our supervision and at our expense.

No obligation to have us look over your dump.

### INDIANA SMELTING & REFINING COMPANY INDIANAPOLIS, INDIANA

NATHAN TROTTER & CO. Established 1789

Pig Tin	Ingot Aluminum	Ingot Copper
Pig Lead		Shot Nickel
Slab Zinc		Antimony

36 No. Front St.  
PHILADELPHIA, PA.

### HORSEHEAD SPELTER AND ALL VIRGIN METALS

Belmont Smelting & Refining Works, Inc.  
General Offices: 332 BELMONT AVE., BROOKLYN, N. Y.  
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### WE BUY PLATING ROOM SCRAP

ANY QUANTITY OF  
NICKEL ANODES  
NICKEL DUST  
NICKEL PEALINGS AND STRIPPINGS  
DISCARDED BASKETS—HOOK RACKS, Etc.  
ALL GRADES METALS AND METALLIC RESIDUES  
INDUSTRIAL METAL CO.  
2900 E. CUMBERLAND ST. PHILADELPHIA, PA.

### RARE METALS AND MINERALS BOUGHT AND SOLD FOR CASH

Platinum, Osmiridium, Palladium, Silver, Quicksilver,  
Amalgams, Bismuth, Osmium, Rhodium, Ruthenium,  
Mercury Lamps, Tungsten, Molybdenum, Etc.

JOSEF RADNAI  
36 FULTON ST. NEW YORK

### Directory of Contract Workers

CASTING, SPINNING, DESIGNING, MOLD MAKING, PLATING SPECIALTIES, ETC.

WM. BERGFELS & CO.  
391 & 393 MULBERRY ST. NEWARK, N. J.  
Spinning in all metals. Oval work a specialty  
Tel. Market 8923

A card in this directory will  
give you the needed publicity.

# BUSINESS WANTS

## FOR SALE—EQUIPMENT, ETC.

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion

# Plating Generator Bargains you can't afford to overlook

These plating generators have been completely re-manufactured and before shipment are *tested under full load*.

Their condition and practical performance is equal to any new equipment.

Prices are at least 30% less than the cost of new machines. An inspection will prove the value.

Ampere Capacity	Volts	Speed	Make	Ampere Capacity	Volts	Speed	Make
(2) 100	6	1200	Hertner	1250/625	6/12	1800	Burke
100	6	1000	Lincoln	1500	9	720	Westinghouse
150	6	1700	Ideal	1650/825	6/12	1200	Burke
200	6	840	Lincoln	2000/1000	6/12	900	General Electric
250	6	1200	Eddy	2000	9	720	General Electric
250	6	1600	Z. L. & L.	2500/1000	6/12	720	Ideal
250	6	1500	Bennett O'Connell	2800/1400	6/12	720	Westinghouse
250	6	1200	Hanson & Van Winkle	3000/1500	6/12	720	Burke
500	6	1160	Hanson & Van Winkle	3200/1600	6/12	600	Eddy
600	3	1100	Bogue	4000/2000	6/12	600	Burke
1000/500	6/12	1150	Hanson & Van Winkle	5000/2500	6/12	514	Triumph
1000	9	900	Westinghouse	10000/5000	6/12	450	Hanson & Van Winkle

Almost any machine listed above can be furnished with direct connected motor drive. If motor generator set is preferred, please give information on current characteristics.

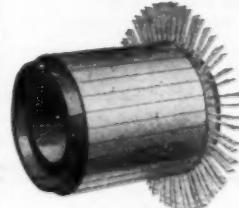
## Grinders and Buffers you can't beat these prices

HP	Make	Volts	Speed	HP	Make	Volts	Speed
1/2	Standard Grinder	110 DC	2600	2	Cincinnati Buffer	220 AC	1800
1	Cincinnati Grinder	115 DC	2000	(2) 3	Roth Buffer	220/440 AC	3600
2	U. S. Buffer	110 DC	2050				

### When your plating generators refuse to do the work—get in touch with Fuerst-Friedman

Experts in the repair of low voltage generators. If you have a troublesome generator pack it up and ship it to us. We'll diagnose the trouble and tell you how we'll make permanent cures. 28 years' experience. Over 500 satisfied customers who'll tell you about us. No obligation or expense in consulting us. We loan generators while repairing yours.

### Replacement Commutators



Commutators are made from hard drawn copper bars. Insulated with pure amber mica. Speed tested at 3600 RPM. Tested for breakdown under 2000 volts.

**THE FUERST-FRIEDMAN COMPANY**  
1295 East 53rd St. Cleveland, Ohio

# BUSINESS WANTS—Continued

## FOR SALE—EQUIPMENT, ETC.

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion

### Polishing and Plating Equipment

#### Plating Dynamos and Motor Generator Sets

All sizes carried in stock.  
Tumbling and Plating Barrels.

Anodes  
Spraying Systems  
Polishing Lathes  
Plating Tanks

Wheels and Buffs  
Ammeters  
Rheostats  
Voltmeters

Steam  
Boilers  
Gas Fired  
Blower Systems

Kane  
and  
Ofeldt

And most anything for the Plating Shop.

J. HOLLAND & SONS, INC.  
489 Broadway, Brooklyn, N. Y.  
Telephone Stagg 5128.

#### Largest Stock of Used Polishing and Plating Supplies in America

Let us have your requirements. Entire plants or parts thereof bought for cash. Send list with prices.

### BURNISHING BARRELS

1—Double No. 1 Baird Burnishing Barrel.  
1—Single No. 1 Baird Burnishing Barrel.  
All Sizes Abbott Ball Co. Burnishing Barrels.  
Several Oblique Tumbling Barrels.  
Motor Driven Buffing Lathes.

BOSTON PLATING SUPPLY CO., INC.  
101 Haverhill St., Boston, Mass.

### A CARD IN THIS DIRECTORY

will sell your surplus machinery and supplies.  
Write today to The Metal Industry, New York.

### PLATING GENERATORS

1—2000/1000 ampere 5/10 volt Hanson Van Winkle, with composition brushes.

1—1500/750 ampere 5/10 volt Hanson Van Winkle.

1—500 ampere 6 volt Hanson Van Winkle, interpole type, with late type composition brushes.

1—500 ampere 6 volt General Electric, with composition brushes.

All machines guaranteed to be in first class electrical and mechanical condition.

BOSTON PLATING SUPPLY CO., INC.  
101 Haverhill St., Boston, Mass.

### WANTED—EQUIPMENT, ETC.

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion.

WANTED—To purchase a going business manufacturing a small brass or steel article. Give full details.

W. S., care of THE METAL INDUSTRY

WANTED—1000 ampere 6-12 volt motor generator. Send complete description and lowest cash price. Also Plating Barrel or small machine.

AMPERE, care of THE METAL INDUSTRY

WANTED—Johnston Knife Rolling Mill, must be in good condition. Also Johnston Die Grinder. Answer with full data. Johnston, care of THE METAL INDUSTRY.

### SITUATIONS OPEN

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion

### SALES REPRESENTATIVE

SITUATION OPEN—FOR STATE OF OHIO WITH HEADQUARTERS PREFERABLY IN CLEVELAND. We want an experienced man who knows the polishing and plating supply trade. Ours is an established line of polishing compositions and a patented mechanical plating machine. Can offer attractive commission arrangement and liberal expense account to man who can furnish proper references. Write to

HEADQUARTERS  
Care of THE METAL INDUSTRY.

### SALESMAN

SITUATION OPEN—With experience in Platers' supplies, to carry side line of established Cleaners for Plater and other Industrial uses. Very attractive commission arrangements. Write Lombard Products Company, Room 620, Monadnock Block, 53 W. Jackson Street, Chicago, Illinois.

### PRODUCTION AND COST ENGINEER

SITUATION OPEN—A manufacturer of art metal stampings desires to secure the services of a production and cost engineer; one who knows good die work, clean embossing and various finishes—who can produce quality work in big production. State previous experience, salary desired and best time for interview. All correspondence strictly confidential.

METAL ART  
Care of THE METAL INDUSTRY.

# BUSINESS WANTS—Continued

## SITUATIONS OPEN—Continued

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion

### SUPERVISOR

SITUATION OPEN—Man with experience in supervising assembly departments. Must be capable of handling an assembly department manufacturing small precision parts. Give full particulars as to experience, references and age in first letter.

Address ASSEMBLY  
Care THE METAL INDUSTRY

### SUPERVISOR

SITUATION OPEN—By a large manufacturing company, an experienced man capable of supervising a manufacturing department producing small mechanical instruments of an intricate nature. Knowledge of punch presses, drill presses, milling machines, gear cutters, etc., necessary. In reply state age, experience, reference and full particulars.

Address MANUFACTURING DEPT.  
Care THE METAL INDUSTRY

### POLISHING FOREMAN

SITUATION OPEN—Modern manufacturing plant located about 25 miles from New York City has opening for working foreman in small polishing room; must be experienced on polishing cast iron, steel, brass and aluminum. Steady work, fifty hours per week under excellent working conditions; good school and church facilities and everything that makes life pleasant in a small town; if found qualified, will be assisted in acquiring own home. Married man between 30 and 40 preferred. Apply by letter, stating experience, age and rate expected.

Modern, care of THE METAL INDUSTRY

### GENERAL MANAGER

SITUATION OPEN—Brass foundryman wanted to act as general manager in complete charge of both foundry and sales. Concern doing about \$100,000 worth of bronze, brass and aluminum work annually. Write, giving age, experience, references, etc.

BOX NO. 12,000  
Care of THE METAL INDUSTRY.

If you are looking for a good man send in a Situation Open Ad for the next issue of

THE METAL INDUSTRY  
90 John St., New York

## SITUATIONS WANTED

Display Advertisements, One Column Wide, \$1 per inch, Each Insertion.

### PRACTICAL FOUNDRYMAN

SITUATION WANTED: An expert practical foundryman, very active, experienced in aluminum, brass and gray iron, who can locate and overcome trouble, hold costs to a minimum and understands short cuts in foundry practice; can handle large or small production.

Address XXX  
Care THE METAL INDUSTRY.

### MANUFACTURING EXECUTIVE

SITUATION WANTED—AVAILABLE JAN. 1, 1929. EIGHTEEN YEARS' MECHANICAL AND PRODUCTION EXPERIENCE MANUFACTURE PRESSED AND DRAWN METAL STAMPINGS; ELECTRICAL SPECIALTIES; TUBULAR PLUMBERS' SUPPLIES; LAMPS; FIXTURES; SCREW MACHINE PRODUCTS; CASTINGS AND HOT DIE PRESSINGS. FAMILIAR MODERN PRODUCTION METHODS; WAGE SYSTEMS; DEVELOPMENT NEW LINES; FACTORY ORGANIZATION FOR LOW OVERHEAD-OPERATING EXPENSE; COST ANALYSIS AND REDUCTION; FACTORY PROCESSES FROM RAW MATERIAL TO FINISHED PRODUCT. NOW EMPLOYED FACTORY MANAGER-SUPERINTENDENT.

MFG. EXECUTIVE  
Care of THE METAL INDUSTRY.

### FOREMAN PLATER

SITUATION WANTED—Plater Foreman wishes position with a manufacturer or jobbing; 25 years' experience on all solutions and finishes. Am a first class production man. Analysis on all solutions.

R. J.  
Care of THE METAL INDUSTRY.

### FOREMAN PLATER

SITUATION WANTED—By man with 12 years' experience as plater. Thoroughly experienced on all solutions, antique finishes, etc.

THEODORE FENER  
1031 Southern Boulevard, New York, N. Y.

### PRACTICAL PLATER AND POLISHER

SITUATION WANTED—Practical Plater and Polisher, able to produce all standard finishes, production assured; also able to analyze all plating solutions.

PLATER AND POLISHER  
Care of THE METAL INDUSTRY.

### FOREMAN POLISHER

POSITION WANTED by a man with 23 years of experience at all lines of work and 12 years as foreman in two different shops. Have charge of 24 men at present but would like to make a change. Can make any finish and understand the piece work system. Address

S. P. E.  
Care of THE METAL INDUSTRY.

### PLATER

SITUATION WANTED—24 years' experience—all finishes and metals. Capable of taking charge or installing plant. Reference on request.

CAPABLE, care of THE METAL INDUSTRY

### MELTER AND CASTER

SITUATION WANTED—Expert on sterling coin silver, silver solders of all percentages, fine gold, 14-18-22 karat, running down scrap gold and silver. Has had 2 years' experience with a large concern. References readily given.

MELTER AND CASTER  
Care of THE METAL INDUSTRY.

# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## ABRASIVES (Also see Emery.)

Alundum  
Sorton Co., Worcester, Mass.  
Artificial  
Abrasive Company, Bridesburg, Philadelphia, Pa.  
General Abrasive Co., Niagara Falls, N. Y.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Zucker Sons Co., Inc., Elizabeth, N. J.  
Emery  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Keystone Emery Mills, Philadelphia, Pa.  
Stevens Co., Inc., Frederic B., Detroit, Mich.

## ACCUMULATORS, HYDRAULIC (Also see Hydraulic Machinery.)

Watson-Stillman Co., New York.

## ACID PIPE

American Hard Rubber Co., New York, N. Y.  
Belke Mfg. Co., Chicago, Ill.

Industrial Filter & Pump Mfg. Co., Chicago, Ill.

## ACID PROOF COCKS

American Hard Rubber Co., New York, N. Y.

General Ceramics Co., New York, N. Y.

## ACID PROOF PIPE

General Ceramics Co., New York, N. Y.

## ACID Resistance, Hard Rubber

American Hard Rubber Co., New York.

Belke Mfg. Co., Chicago, Ill.

Industrial Filter & Pump Mfg. Co., Chicago, Ill.

## ACIDS

Boracic  
Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

## Chromic

Chas. Cooper & Co., New York.

Du Pont de Nemours, E. I., Co., Inc.,

Wilmington, Del.

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

Kuttroff, Pickhardt & Co., New York, N. Y.

Merck & Co., Rahway, N. J.

Mutual Chemical Co., New York, N. Y.

## Hydrofluoric

General Chemical Co., Philadelphia, Pa.

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

## Oil of Vitrol (Sulphuric)

Hegeler Zinc Co., Danville, Ill.

Zapon Co., The, New York, N. Y.

## Oxalic

Mutual Chemical Co., New York, N. Y.

## Sulphuric

Mutual Chemical Co., New York, N. Y.

## AEROPLANE DOPE

Egyptian Lacquer Mfg. Co., New York.

Nikolas & Co., G. J., Chicago, Ill.

Zapon Co., The, New York, N. Y.

## Mechanical

Belke Mfg. Co., Chicago, Ill.

Industrial Filter & Pump Mfg. Co., Chicago, Ill.

Industrial Filter & Pump Mfg. Co., Chicago, Ill.

## Mechanical

Belke Mfg. Co., Chicago, Ill.

Industrial Filter & Pump Mfg. Co., Chicago, Ill.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

## AIR BRUSHES, COMPRESSORS AND ACCESSORIES (See Sprayers; Spraying Accessories.)

DeVilbiss Mfg. Co., Toledo, O.

Ideal Air Brush Mfg. Co., New York.

## AIR FILTERS

DeVilbiss Mfg. Co., Toledo, O.

## ALLOYS (See also Kind Wanted.)

### Non-Ferrous

American Brass Co., Waterbury, Conn.

Duriron Co., The, Dayton, Ohio.

Niagara Falls Smelting & Refining Corp., Buffalo, N. Y.

### Brass, Bronze, Nickel Silver

American Brass Co., Waterbury, Conn.

Niagara Falls Smelting & Refining Corp., Buffalo, N. Y.

## ALUMINUM (See Ingots, Sheets, Wire, Rod etc.)

### Angles and Channels

Aluminum Company of America, Pittsburgh, Pa.

### Sheet

Sheet Aluminum Co., Jackson, Mich.

Straub Aluminum Co., New York.

### ALUMINUM ALLOYS

Aluminum Company of America, Pittsburgh, Pa.

### Alundum

Norton Co., Worcester, Mass.

## AMMETERS (See also Electrical Apparatus and Equipment.)

Connecticut Dynamo & Motor Co., Irvington, N. J.

Crown Rheostat & Supply Co., Chicago, Ill.

Chas. F. L'Hommedieu & Sons, Chicago, Ill.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

## AMYL ACETATE

Egyptian Lacquer Mfg. Co., New York.

Mars & Waldstein Co., Newark, N. J.

Zapon Co., The, New York, N. Y.

## ANNEALING FURNACES

### Electric

### Oil or Gas

Monarch Engineering & Mfg. Co., Baltimore, Md.  
Rockwell, W. S., Company, New York.

## ANODES

### All Metals

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

Chas. F. L'Hommedieu & Sons, Chicago, Ill.

The Lustre Co., Inc., St. Louis, Mo.

U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn,

N. Y.

### Brass and Bronze

Apothecaries Hall Co., Waterbury, Conn.

Daniels & Orben Co., Inc., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw, Fuller & Goodwin Co., Cleveland, O.

Lasalco, Inc., St. Louis, Mo.

MacDermid Incorporated, Waterbury, Conn.

Seymour Mfg. Co., Seymour, Conn.

Stevens, Inc., Frederic B., Detroit, Mich.

### Cadmium

American Cyanamid Co., New York.

Grasselli Chemical Co., Cleveland, Ohio.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw, Fuller & Goodwin Co., Cleveland, O.

Roessler & Hasslacher Chemical Co., New York, N. Y.

Udylite Process Co., Kokomo, Ind.

### Copper

American Brass Company, Waterbury, Conn.

Apothecaries Hall Co., Waterbury, Conn.

Daniels & Orben Co., Inc., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw, Fuller & Goodwin Co., Cleveland, O.

Hussey, C. G., & Co., Pittsburgh, Pa.

Lasalco, Inc., St. Louis, Mo.

L'Hommedieu, Chas. F., & Sons Co., Chicago, Ill.

MacDermid Incorporated, Waterbury, Conn.

Seymour Mfg. Co., Seymour, Conn.

Stevens, Inc., Frederic B., Detroit, Mich.

Stutz, Geo. A., Mfg. Co., Chicago, Ill.

### Gold

Handy & Harman, New York.

### Lead

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

### Nickel

Apothecaries Hall Co., Waterbury, Conn.

Crown Rheostat & Supply Co., Chicago, Ill.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw, Fuller & Goodwin Co., Cleveland, O.

Lasalco, Inc., St. Louis, Mo.

MacDermid Incorporated, Waterbury, Conn.

Seymour Mfg. Co., Seymour, Conn.

Stevens, F. B., Detroit, Mich.

Stutz, Geo. A., Mfg. Co., Chicago, Ill.

### Platinum

Handy & Harman, New York.

Jackson, John J., Co., Newark, N. J.

Roessler & Hasslacher Chemical Co., New York.

### Silver

Handy & Harman Co., New York.

### Tin

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

### Zinc

Apothecaries Hall Co., Waterbury, Conn.

Grasselli Company, The, Cleveland, Ohio.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw, Fuller & Goodwin Co., Cleveland, O.

L'Hommedieu, Chas. F., & Sons Co., Chicago, Ill.

Meeker, The Co., Chicago, Ill.

Roessler & Hasslacher Chemical Co., New York, N. Y.

Stutz, Geo. A., Mfg. Co., Chicago, Ill.

## ANTI-FRICTION METAL (See also Babbitt Metal and Bearings.)

Ajax Metal Co., Philadelphia, Pa.

## ASSAY CRUCIBLES, Sand

Joseph Dixon Crucible Company, Jersey City, N. J.

Plumbago Crucible Association, The, New York.

## ASSAYERS AND CHEMISTS (See also Testing Laboratories.)

Pitkin, Lucius, Inc., New York.

## AUTOMATIC METAL CLEANING MACHINES

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

Ideal Industrial Machinery Co., Cincinnati, Ohio.

## AUTOMATIC POLISHING MACHINES

Acme Mfg. Co., Detroit, Mich.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

## AUTOMATIC WIRE AND SHEET METAL WORKING MACHINERY

Baird Machine Co., Bridgeport, Conn.

## BABBITT METAL (See also Bearings.)

Ajax Metal Co., Philadelphia, Pa.

Michigan Smelting & Refining Co., Detroit, Mich.

## BABBITT MOLDS (See Molds.)

## BALL BURNISHING EQUIPMENT (Also see Burnishing and Polishing Barrels.)

Abbott Ball Co., Hartford, Conn.

Baird Machine Co., Bridgeport, Conn.

Globe Machine & Stamping Co., Cleveland, Ohio.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Hartford Steel Ball Co., The, Hartford, Conn.

Ideal Industrial Machinery Co., Cincinnati, Ohio.

## BALLS & SPECIAL SHAPES—STEEL

Abbott Ball Co., Hartford, Conn.

Beaver, H. Leroy Co., Philadelphia, Pa.

Hartford Steel Ball Co., The, Hartford, Conn.

## BARS; SILVER, GOLD, PLATINUM

Handy & Harman, New York.

## BASKETS DIPPING

American Hard Rubber Co., New York, N. Y.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Smith & Co., John P., New Haven, Conn.

## BEARINGS (Also see Babbitt metal and Anti-Friction Metal.)

### Babbitt

Ajax Metal Co., Philadelphia, Pa.

### BLAST FORGES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Miner & Peck Mfg. Co., Derby, Conn.

## BLAST GATES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Miner & Peck Mfg. Co., Derby, Conn.

## BLowers AND BLOW PIPING (See also Exhaust Fans and Heads.)

Astle, H. J., & Co., Providence, R. I.

Grand Rapids Blow Pipe & Dust Arrestor Co., Grand Rapids, Mich.

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Monarch Engineering & Mfg. Co., Baltimore, Md.

## BLowers AND EXHAUSTERS

General Ceramics Co., New York, N. Y.

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## BLowers, HIGH PRESSURE

Leiman Bros., New York.

## BOILER INSULATION (See Brick, Insulating Cement.)

## BOILERS, SETTING (See Fire Cement.)

## BOILERS, WATER TUBE

Babcock & Wilcox Co., New York.

## BONE ASH

### All Grades

Wilkes-Martin-Wilkes Co., New York, N. Y.

## BRASS (See Brass Mill Products; Wire Mill Products; Anodes; Castings; Die Castings; Forgings; Ingots; Rods and Bars; Sheets; Strip Metal; Tubes; Wire.)

## BRASS FOUNDERS (See Castings.)

## BRASS FOUNDRY EQUIPMENT & SUPPLIES (See Kind Wanted.)

## BRASS MILL ENGINEERS (See Engineers.)

## BRASS MILL MACHINERY (Also see kind Wanted.)

## BRASS MILL PRODUCTS

American Brass Co., Waterbury, Conn.

Baltimore Brass Co., Baltimore, Md.

Seymour Mfg. Co., Seymour, Conn.

## BRASS ROLLING MILL MACHINERY

Torrington Mfg. Co., Torrington, Conn.

## BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

### BRONZING LIQUID

Anderson Chemical Co., New York.  
Egyptian Lacquer Mfg. Co., New York.  
Nikolas & Co., G. J., Chicago, Ill.  
Waukegan Chemical Co., Waukegan, Ill.  
Zapon, The Co., New York.  
Zeller Lacquer Mfg. Co., New York.

### BRUSHES

#### Hand

Blumenthal, H. & Co., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Nikolas & Co., G. J., Chicago, Ill.

#### Wheel

Blumenthal, H. & Co., New York.  
Boissier Elec. Corp., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

### BUFFING AND POLISHING COMPOSITION

Apothecaries Hall Co., Waterbury, Conn.  
Boissier Elec. Corp., New York, N. Y.  
Buchanan, Thos. Co., Cincinnati, Ohio.  
Burns & Sons, Inc., E. Reed, Brooklyn, N. Y.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Lasalco, Inc., St. Louis, Mo.  
Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. J.  
Oden Corp., College Point, L. I., N. Y.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stutz, Geo. A., Mfg. Co., Chicago, Ill.  
Zucker Sons Co., Inc., Roselle, N. J.

### BUFFING MACHINES

(See Polishing and Buffing Machines.)  
Electric

Hanson-Van Winkle-Munning Co., Matawan, N. J.

### BUFFING MACHINES AUTOMATIC (Also see Polishing Lathes and Heads.)

Divine Bros. Co., Utica, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Metal Finishers Mach. Co., Cleveland, Ohio.

### BUFFING AND POLISHING WHEELS (Also see Buffs.)

#### Canvas, Cotton, Etc.

Advance Wheel Mfg. Co., Chicago, Ill.  
Allied Industrial Products Co., Chicago, Ill.  
Buchanan, Thos. Co., Cincinnati, Ohio.  
Codman, F. L. & J. C., Co., So. Boston, Mass.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Divine Bros. Co., Utica, N. Y.  
Eastern Felt Co., Winchester, Mass.  
Griffiths, K. F., Buff Co., Inc., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Lasalco, Inc., St. Louis, Mo.  
Lea Mfg. Co., The, Waterbury, Conn.  
L'Hommedieu, Chas. F., & Sons Co., Chicago, Ill.  
Yerges Buff Co., Fremont, Ohio.

#### Felt

Advance Wheel Mfg. Co., Chicago, Ill.  
Codman, F. L. & J. C. Co., So. Boston, Mass.  
Divine Bros. Co., Utica, N. Y.  
Eastern Felt Co., Winchester, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Pressed Leather Wheel Co., Little Falls, N. Y.  
Yerges Buff Co., Fremont, Ohio.

#### Leather

Advance Wheel Mfg. Co., Chicago, Ill.  
Divine Bros. Co., Utica, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

#### Sheepskin

Advance Wheel Mfg. Co., Chicago, Ill.  
Codman, F. L. & J. C. Co., So. Boston, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

### BUFFS (Also see Buffing and Polishing Wheels.)

Advance Wheel Mfg. Co., Chicago, Ill.  
Allied Industrial Products Co., Chicago, Ill.  
Buchanan, Thos. Co., Cincinnati, Ohio.  
Burns & Sons, Inc., E. Reed, Brooklyn, N. Y.  
Codman, F. L. & J. C. Co., So. Boston, Mass.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Divine Bros. Co., Utica, N. Y.  
Griffiths, K. F., Buff Co., Inc., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Lasalco, Inc., St. Louis, Mo.  
MacDermid Incorporated, Waterbury, Conn.  
Oden Corp., College Point, L. I., N. Y.  
Pressed Leather Wheel Co., Little Falls, N. Y.  
Stutz, Geo. A., Mfg. Co., Chicago, Ill.  
Yerges Buff Co., Fremont, Ohio.

### BUILDING PAINT SPRAYERS

DeVilbiss Mfg. Co., Toledo, O.

### BURNERS (Also see Furnaces.)

#### Air and Gas Pre-Mixing

Campbell-Hausfeld Co., Harrison, Ohio.  
Monarch Engineering & Mfg. Co., Baltimore, Md.

#### Air and Gas Pre-Mixing

Campbell-Hausfeld Co., Harrison, Ohio.

#### Oil or Gas

Babcock & Wilcox Co., The, New York.  
Campbell-Hausfeld Co., Harrison, Ohio.  
Johnson Gas Appliance Co., Cedar Rapids, Ia.

### BURNISHING AND POLISHING BARRELS

Abbott Ball Co., Hartford, Conn.

Baird Machine Co., Bridgeport, Conn.

Crown Rheostat & Supply Co., Chicago, Ill.

Globe Machine & Stamping Co., Cleveland, Ohio.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Hartford Steel Ball Co., Hartford, Conn.

Henderson Bros. Co., Waterbury, Conn.

Ideal Industrial Machinery Co., Cincinnati, Ohio.

Lupomadic Tumbling Machine Co., New York.

Smith Richardson Co., Attleboro, Mass.

### BURNISHING COMPOUNDS AND CHIPS (Also see Soap.)

Abbott Ball Co., Hartford, Conn.

Beaver, H. Leroy Co., Philadelphia, Pa.

Hartford Steel Ball Co., The, Hartford, Conn.

International Chemical Co., Philadelphia, Pa.

Lupomadic Tumbling Machine Co., New York.

### CABLING MACHINERY

Torrington Mfg. Co., Torrington, Conn.

### CADMUM PLATING

Grasselli Chemical Co., Cleveland, Ohio.

Roessler & Hasslacher Chemical Co., New York.

Udyline Process Co., Detroit, Mich.

### CANVAS WHEELS (See Buffing and Polishing Wheels.)

### CASTINGS

#### Acid Proof

The Duriron Co., Dayton, Ohio.

#### Aluminum

Aluminum Company of America, Pittsburgh, Pa.

#### Brass, Bronze and Composition

Ajax Metal Co., Philadelphia, Pa.

#### CAUSTIC SODA

Buchanan, The, Thos. Co., Cincinnati, Ohio.

International Chemical Co., Philadelphia, Pa.

Roessler & Hasslacher Chemical Co., New York.

### CEMENT (See Fire Cement; Insulating Cement.)

### CEMENT

#### Furnace

Campbell-Hausfeld Co., Harrison, Ohio.

### CENTRIFUGAL DRYERS AND EXTRACTORS (Also see Drying-Out Machines.)

Tolhurst Machine Works, Troy, N. Y.

### CENTRIFUGAL PUMPS

American Hard Rubber Co., New York, N. Y.

General Ceramics Co., New York, N. Y.

### CHAIN GRATE STOKERS

Babcock & Wilcox Co., New York.

### CHEMICALS, DEALERS IN ALL KINDS (Also see Kind Wanted.)

#### Platers

Chas. Cooper & Co., New York.

Du Pont de Nemours, E. I. Co., Inc., Wilmington Del.

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

The Lustre Co., Inc., St. Louis, Mo.

Merck & Co., Rahway, N. J.

Roessler & Hasslacher Chemical Co., New York, N. Y.

Wilkes-Martin-Wilkes Co., New York, N. Y.

Platers and Galvanizers Equipment

U. S. Galvanizing & Plating Equip. Corp., Brooklyn, N. Y.

### CHEMISTS, CHROMIUM

Weisberg & Greenwald, New York, N. Y.

### CHEMISTS, CONSULTING (See Assayers and Chemists; Testing Laboratories.)

Weisberg & Greenwald, New York, N. Y.

### CHLORIDE

#### Nickel

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

### CHROMIC ACID

Cooper & Co., Chas., New York.

Du Pont de Nemours, E. I. Co., Inc., Wilmington, Del.

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

Kuttroff, Pickhardt, New York, N. Y.

Merck & Co., Rahway, N. J.

Mutual Chemical Co., New York, N. Y.

### CHROMIUM

Atlas Plating Works, Inc., Cleveland, Ohio.

Chromic Corp. of America, New York.

General Chromium Corp., Detroit, Mich.

Metal & Thermit Corp., New York.

National Chromium Corp., New York, N. Y.  
Tillmann Electro Plating Wks., Inc., New York.  
Weisberg & Greenwald, New York.

### CHROMIUM PLATING

Chromium Corp. of America, New York.

Chromium Machine Co., Inc., Sag Harbor, L. I.

General Chromium Corp., Detroit, Mich.

National Chromium Corp., New York, N. Y.

New Haven Sherardizing Co., The, Hartford, Conn.

Tillmann Electro Plating Wks., Inc., New York.

United Chromium, Inc., Detroit, Mich.

Weisberg & Greenwald, New York.

### CONTROLLERS

Foxboro Co., The, Foxboro, Mass.

St. Louis Motor Valve Co., St. Louis, Mo.

### CHROMIUM MACHINERY

Chromium Machine Co., Inc., Sag Harbor, L. I.

### CHROMIUM PLATING POLISH

E. Reed Burns & Sons, Brooklyn, N. Y.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Chas. F. L'Hommedieu & Sons, Chicago, Ill.

Matchless Metal Polish Co., Glen Ridge, N. J.

Zucker Sons Co., Inc., Roselle, N. J.

### CHUCKING MACHINES, AUTOMATIC

Baird Machine Co., Bridgeport, Conn.

### CHUCKS

#### Oval

Prybil, P., Machine Co., New York.

#### Spinning

Prybil, P., Machine Co., New York.

### CLEANERS, METAL

Allied Industrial Products Co., Chicago, Ill.

Cowles Detergent Co., Cleveland, Ohio.

Ford, J. B., Co., Wyandotte, Mich.

Fuller, W. A., Co., Greensburg, Pa.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

International Chemical Co., Philadelphia, Pa.

Lasalco, Inc., St. Louis, Mo.

The Lustre Co., Inc., St. Louis, Mo.

MacDermid, Inc., Waterbury, Conn.

Magnus Chemical Co., Garwood, N. J.

Magnuson Products Corp., Brooklyn, N. Y.

Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. Y.

Oakite Products, Inc., New York, N. Y.

Stevens, Inc., Frederic B., Detroit, Mich.

Sulphur Products Co., Greensburg, Pa.

### CLEANING APPARATUS, AUTOMATIC

METAL (Also see Pickling Machines.)

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

Ideal Industrial Machinery Co., Cincinnati, Ohio.

### CLEANING COMPOUNDS (See also Fig. Cleaner; Pickling Compounds, Whale Oil Soaps.)

#### Metal

Anthony, H. M., Co., New York.

Apothecaries Hall Co., Waterbury, Conn.

Cowles Detergent Co., Cleveland, Ohio.

Ford, J. B., Co., Wyandotte, Mich.

Fuller, W. A., Co., Greensburg, Pa.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

International Chemical Co., Philadelphia, Pa.

Lasalco, Inc., St. Louis, Mo.

The Lustre Co., Inc., St. Louis, Mo.

MacDermid, Inc., Waterbury, Conn.

Magnus Chemical Co., Garwood, N. J.

Magnuson Products Corp., Brooklyn, N. Y.

Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. Y.

Oakite Products, Inc., New York, N. Y.

Stevens, Inc., Frederic B., Detroit, Mich.

Sulphur Products Co., Greensburg, Pa.

### CLEANING SOLVENTS

Waukegan Chemical Co., Waukegan, Ill.

### CLEANING SYSTEMS (Vacuum)

Allington & Curtis Co., Saginaw, Mich.

### COCK GRINDERS

#### Automatic

Turner Foundry & Machine Co., Philadelphia, Pa.

### COCKS

#### Acid Proof

Duriron, The, Co., Inc., Dayton, Ohio.

### COLLECTING SYSTEMS (Dust, Shavings, Sawdust, Dust Metal.)

Allington & Curtis Co., Saginaw, Mich.

### COMMUTATORS

Belke Mfg. Co., Chicago, Ill.

Industrial Filter & Pump Mfg. Co., Chicago, Ill.

### COMPOSITION METAL (See Castings; Ingots, Etc.)

#### Greaseless, for Metal Finishing

Lea Mfg. Co., The, Waterbury, Conn.

### COMPOSITIONS (See Buffing and Polishing Composition; Flooring Composition.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Chas. F. L'Hommedieu & Sons, Chicago, Ill.

The Lustre Co., Inc., St. Louis, Mo.

### COMPOUNDS, CUTTING AND GRINDING DRAWING, STAMPING

International Chemical Co., Philadelphia, Pa.

Magnuson Products Corp., Brooklyn, N. Y.

Oakite Products, Inc., New York, N. Y.

When writing to advertisers, please mention THE METAL INDUSTRY

## BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

**COMPRESSORS, AIR & GAS** (See Air Compressors.)

**CONCENTRATING TABLES** (See Reclaiming Machinery.)

**CONTRACT PLATING** (All Kinds)

Sievering, Philip, Inc., New York, N. Y.  
Tillmann Electro Plating Wks., Inc., New York, N. Y.

**CONTROLLERS**

Foxboro Co., The, Foxboro, Mass.

**CONVEYING SYSTEMS** (Pneumatic Light Materials.)

Allington & Curtis Co., Saginaw, Mich.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

**COPPER** (Also see Anodes; Castings; Ingots, Rods and Bars; Sheets; Smelters and Refineries; Strip Metal; Tubes; Wire, Etc.)

Sheet, Wire, Rod, Tube

American Brass Co., Waterbury, Conn.  
Conklin, T. E., Brass & Copper Co., New York.

**COPPER BEARING MATERIAL, BUYERS OF** (See Drosses, Residues, Etc.)

**COPPER BORONIC**

American Boron Products Co., Buffalo, N. Y.

**COPPER, CARBONATE OF**

Cooper, Chas. & Co., New York, N. Y.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
L'Hommedieu & Sons, Chas. F., Chicago, Ill.  
Roessler & Hasslacher Chemical Co., New York, N. Y.

**COPPER-CYANIDE**

American Cyanamid Co., New York.  
Roessler & Hasslacher Chemical Co., New York, N. Y.

Zapon Co., The, New York, N. Y.

**CORE MACHINES**

Stevens, Inc., Frederic B., Detroit, Mich.

**CORE OIL AND COMPOUNDS**

Stevens, Inc., Frederic B., Detroit, Mich.

**CORE OVEN INSULATION** (See Brick Insulating; Insulating Cement; Insulating Oven.)

**CORE OVENS**

Coal and Coke

Monarch Engineering & Mfg. Co., Baltimore.  
E. E. Steiner & Co., Newark, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

Oil and Gas

Monarch Engineering & Mfg. Co., Baltimore, Md.  
Stevens, Inc., Frederic B., Detroit, Mich.

**COPLES**

Dixon, Joseph, Crucible Co., Jersey City, N. J.

**CRUCIBLES, METAL MELTING**

Dixon, Joseph, Crucible Co., Jersey City, N. J.  
Lava Crucible Co., of Pittsburgh, Pittsburgh, Pa.  
McCullough-Dalzell Crucible Co., Pittsburgh, Pa.  
Naugatuck Valley Crucible Co., Shelton, Conn.  
Plumbago Crucible Association, The, New York.  
Ross Tacony Crucible Co., Tacony, Philadelphia, Pa.

Stevens, Inc., Frederic B., Detroit, Mich.

**CRUSHERS AND PULVERIZERS** (See also Reclaiming Machinery.)

Eastern Machinery Co., New Haven, Conn.  
Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Standard Equipment Co., New Haven, Conn.

**CUPRO-NICKEL** (See Brass Mill Products.)

**CUTTING, STRAIGHTENING & FORMING MACHINERY**

Wire

Baird Machine Co., Bridgeport, Conn.  
Schuster, F. B., Co., New Haven, Conn.  
Strip Metal

American Cyanamid Co., New York.

Baird Machine Co., Bridgeport, Conn.

Buchanan, Thos., Co., Cincinnati, Ohio.

Crown Rheostat & Supply Co., Chicago, Ill.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Schuster, F. B., Co., New Haven, Conn.

**CYANIDES**

American Cyanamid Co., New York.

**DEOXIDIZERS, METAL** (See Fluxes.)

**DIE CASTINGS**

Aluminum

Aluminum Company of America, Pittsburgh, Pa.

**DIE CASTING MACHINES**

Soft Metal

Byrd, R. E., Erie, Pa.

**DIPPING BASKETS**

Dipping and Plating

American Hard Rubber Co., New York.

General Ceramics Co., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Smith, John P., Co., New Haven, Conn.

U. S. Stoneware Co., New York.

**Stoneware**

General Ceramics Co., New York.

**DRAW BENCHES**

Wire, Rod, Tube

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Watson-Stillman Co., New York.

**DRAWING AND STAMPING** (See Metal Goods Made to Order; Stamping and Drawing.)

**DRINKING WATER SUPPLY SYSTEMS**

Armstrong Cork & Insulation Co., Pittsburgh, Pa.

**DROP LIFTERS** (See also Presses, Drop Lifters for.)

Automatic

Miner & Peck Mfg. Co., Derby, Conn.

**DROSSES, RESIDUES, ETC., BUYERS OF** (Also see Metal Dealers, Old.)

**DRYERS** (See Centrifugal Dryers; Ovens; Drying-Out Machines; Ladle Heaters and Dryers; Mold Dryers; and Dryers; Sawdust Drying-Out Boxes.)

**DRYING-OUT MACHINES** (See also Centrifugal Dryers and Extractors; Sawdust Drying-Out Boxes.)

Baird Machine Co., Bridgeport, Conn.  
Smith-Richardson Co., Attleboro, Mass.

Automatic

Astle, H. J. & Co., Providence, R. I.

Tohurst Machine Works, Troy, N. Y.

**DUST COLLECTORS AND VENTILATING SYSTEMS** (Also see Exhaust Fans and Heads.)

Astle, H. J. & Co., Providence, R. I.  
Cleveland Blow Pipe & Mfg. Co., Cleveland, Ohio.  
Grand Rapids Blow Pipe & Dust Arrestor Co., Grand Rapids, Mich.

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Pangborn Corp., Hagerstown, Md.

**DUSTLESS SAWDUST**

Miller, Frank, & Sons, Chicago, Ill.

**DYNAMOS, LOW VOLTAGE, PLATING AND GALVANIZING** (Also see Electrical Apparatus and Equipment.)

Bogue, Chas. J., Electric Co., New York.

Boissier Elec. Corp., New York, N. Y.

Chandeysson Electric Co., St. Louis, Mo.

Connecticut Dynamo & Motor Co., Irvington, N. J.

Crown Rheostat & Supply Co., Chicago, Ill.

Eager Electric Co., Watertown, N. Y.

Electric Products Co., The, Cleveland, O.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Ident Electric & Mfg. Co., Mansfield, Ohio.

Jants & Leist Electric Co., Cincinnati, Ohio.

Meeker, The, Co., Chicago, Ill.

Stevens, Inc., Frederic B., Detroit, Mich.

Stutz, Geo. A., Mfg. Co., Chicago, Ill.

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

**DYNAMOS, PLATING, USED**

Fuerst-Friedman Co., Cleveland, Ohio.

J. Holland Sons, Brooklyn, N. Y.

**ELECTRIC CRANES** (See Cranes.)

**ELECTRIC FURNACES**

Melting

Ajax Metal Co., Philadelphia, Pa.

Refractories

Bartley, Jonathan, Crucible Co., Trenton, N. J.

**ELECTRIC OVENS** (See Ovens; also Core Ovens.)

**ELECTRICAL APPARATUS AND EQUIPMENT** (Also see Ammeters, Rheostats, Switchboards, Transformers, Voltmeters.)

Bogue, Chas. J., Electric Co., New York.

**ELECTRICAL CONDUCTORS**

Aluminum

Aluminum Company of America, Pittsburgh, Pa.

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

**ELECTRO GALVANIZING EQUIPMENT AND SUPPLIES** (See Dynamos; Plating Barrels; Plating Machines, Automatic; Tanks, Etc.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Meeker, The, Co., Chicago, Ill.

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

**ELECTRO GALVANIZING JOB AND CONTRACT**

Hassall, John, Inc., Brooklyn, N. Y.

Meeker, The, Co., Chicago, Ill.

Mercl Plating Equipment Co., Chicago, Ill.

**ELECTRO PLATING EQUIPMENT AND SUPPLIES** (See also Kind Wanted.)

Boissier Elec. Corp., New York, N. Y.

Crown Rheostat & Supply Co., Chicago, Ill.

Daniels & Orben Co., Inc., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

**EQUIPMENT**

Chromium Plating

Chromium Machine Co., Inc., Sag Harbor, L. I.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Chas. F. L'Hommedieu & Sons, Chicago, Ill.

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

Weisberg & Greenwald, New York.

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<b>Electro Plating</b> Hanson-Van Winkle-Munning Co., Matawan, N. J. Mercil Plating Equipment Co., Chicago, Ill.	<b>FOUNDRY FACINGS</b> Dixon, Joseph, Crucible Co., Jersey City, N. J. Plumbago Crucible Association, The, New York. Stevens, Inc., Frederic B., Detroit, Mich.	<b>GRINDING MACHINES</b> Divine Bros. Co., Utica, N. Y. Hanson-Van Winkle-Munning Co., Matawan, N. J. Stevens, Inc., Frederic B., Detroit, Mich.
<b>ESCUOTHEON PINS, ALL METAL</b> Hassall, John, Inc., Brooklyn, N. Y.	<b>FOUNDRY RIDDLES</b> (See Sand Sifters.)	<b>Electric</b> Hanson-Van Winkle-Munning Co., Matawan, N. J.
<b>ETHYL ACETATE</b> Zapon Co., The, New York, N. Y.	<b>FOUNDRY SPRAYERS</b> (See Sprayers.)	<b>GRINDING WHEEL HOODS</b> (See Dust Collectors and Ventilating Systems; Hoods.)
<b>EXHAUST FANS AND HEADS</b> (Also see Blowers and Blow Piping; Dust Collectors and Ventilating Systems.) Grand Rapids Blow Pipe & Dust Arrestor Co., Grand Rapids, Mich. Kirk & Blum Mfg. Co., Cincinnati, Ohio. Acid Proof Duriron, The Co., Inc., Dayton, Ohio.	<b>Frictions</b> Divine Bros. Co., Utica, N. Y.	<b>HARD RUBBER FITTINGS</b> American Hard Rubber Co., New York. Belke Mfg. Co., Chicago, Ill. Industrial Filter & Pump Mfg. Co., Chicago, Ill.
<b>EXHAUST SYSTEMS</b> Allington & Curtis Co., Saginaw, Mich. Kirk & Blum Mfg. Co., Cincinnati, Ohio.	<b>FURNACE CEMENT</b> (See also Fire Cement.) Campbell-Hausfeld Co., Harrison, Ohio.	<b>Pipe</b> Belke Mfg. Co., Chicago, Ill. Industrial Filter & Pump Mfg. Co., Chicago, Ill.
<b>EXTRUDED SHAPES</b> Brass, Copper and Bronze	<b>FURNACE ENGINEERS</b> (See Engineers.)	<b>Hard Rubber Tanks</b> American Hard Rubber Co., New York.
<b>FACINGS</b> (See Foundry Facings.)	<b>FURNACE INSULATION</b> (See Brick Insulating; Insulating Cement; Insulation, Furnace.)	<b>HOODS</b> (Also see Dust Collectors and Ventilating Systems.)
<b>FANS (Exhaust)</b> Allington & Curtis Co., Saginaw, Mich.	<b>FURNACES</b> (See Annealing Furnaces; Burners; Electric Furnaces; Galvanizing & Tinning Furnaces; Heat Treating Furnaces; Melting Furnaces; Powdered Coal Burning Furnaces; Sherardizing Furnaces; Smelting Furnaces.) Ajax Metal Co., Philadelphia, Pa. Monarch Engineering & Mfg. Co., Baltimore, Md.	<b>Polishing and Grinding Wheel</b> Grand Rapids Blow Pipe & Dust Arrestor Co., Grand Rapids, Mich. Kirk & Blum Mfg. Co., Cincinnati, Ohio.
<b>FEEDERS</b> (Furnace, Wood Waste.) Allington & Curtis Co., Saginaw, Mich.	<b>FURNACE TILE AND LININGS</b> (Also see Fire Brick.) Monarch Engineering & Mfg. Co., Baltimore, Md. Quigley Furnace Specialties Co., New York.	<b>Spraying</b> De Vilbiss Mfg. Co., Toledo, Ohio. Grand Rapids Blow Pipe & Dust Arrestor Co., Grand Rapids, Mich.
<b>FELT</b> Allied Industrial Products Co., Chicago, Ill. American Felt Co., Boston, Mass.	<b>FUSE METAL</b> Platt Bros. & Co., Waterbury, Conn.	<b>HOT GALVANIZING AND TINNING EQUIPMENT</b> (See Burners; Galvanizing and Tinning Furnaces; Kettles; Tanks.)
<b>FELT, POLISHING</b> American Felt Co., Boston, Mass. Eastern Felt Co., Winchester, Mass.	<b>Galvanizing</b> (See also Electro Galvanizing Job, and Contract; Hot Galvanizing, Job and Contract.) U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.	<b>HOT TINNING EQUIPMENT</b> (See Hot Galvanizing and Tinning Equipment.)
<b>FELT POLISHING WHEELS</b> Codman, F. L. & J. Co., Co., So. Boston, Mass. Crown Rheostat & Supply Co., Chicago, Ill. Divine Bros. Co., Utica, N. Y.	<b>GALVANIZING AND TINNING FURNACES</b> (Also see Burners.) Monarch Engineering & Mfg. Co., Baltimore, Md.	<b>HYDRAULIC MACHINERY, PRESSES, JACKS, ETC.</b> (Also see Accumulators, Presses.) Farrel-Birmingham Co., Inc., Ansonia, Conn. Watson-Stillman Co., New York.
<b>FELT SHEETS</b> American Felt Co., Boston, Mass. Eastern Felt Co., Winchester, Mass. L'Hommedieu & Sons, Chas. F., Chicago, Ill.	<b>GALVANIZING EQUIPMENT AND SUPPLIES</b> (See Kinds Wanted. Also Plating Galvanizing Machines. Automatic; Hot and Galvanizing Barrels; Plating and Galvanizing and Tinning Equipment.) Hanson-Van Winkle-Munning Co., Matawan, N. J. U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.	<b>INGOTS</b> (Also see Calcium-Copper; Manganese-Copper; Phosphor-Copper; Phosphor-Tin; Silicon-Copper; Smelters and Refiners.)
<b>FELT WHEELS</b> Eastern Felt Co., Winchester, Mass.	<b>GAS APPLIANCES</b> Johnson Gas Appliance Co., Cedar Rapids, Ia.	<b>Aluminum</b> Aluminum Company of America, Pittsburgh, Pa. British Aluminium Co., New York and Toronto, Ontario. Niagara Falls Smelting & Refining Corp., Buffalo, N. Y.
<b>FERRULES, BRASS AND COPPER</b> American Brass Co., Waterbury, Conn.	<b>GAS BURNERS</b> (See Burners.)	<b>Brass, Bronze and Composition</b> Ajax Metal Company, Philadelphia, Pa. Belmont Smelting & Refining Works, Brooklyn, N. Y. Niagara Falls Smelting & Refining Corp., Buffalo, N. Y.
<b>FIG CLEANERS</b> (Also see Cleaning Compounds, Whale Oil Soap.) International Chemical Co., Philadelphia, Pa.	<b>GATE CUTTERS</b> (See Saws; Sprue Cutters.)	<b>Copper</b> Hendricks Bros., New York. Trotter, Nathan, & Co., Philadelphia, Pa.
<b>FILTER AERATING &amp; AGITATING SYSTEM</b> Belke Mfg. Co., Chicago, Ill. Industrial Filter & Pump Mfg. Co., Chicago, Ill.	<b>GENERATORS</b> (See Dynamos; Motor-Generator Sets.) Chandeyson Electric Co., St. Louis, Mo. Eager Electric Co., Watertown, N. Y. Electric Products Co., The, Cleveland, Ohio. Hanson-Van Winkle-Munning Co., Matawan, N. J. Chas. F. L'Hommedieu & Sons, Chicago, Ill. Lustre Co., Inc., The, St. Louis, Mo. U. S. Galvanizing — Pltg. Equip. Corp., Brooklyn, N. Y.	<b>Lead</b> United Metals Selling Co., New York.
<b>FILTER SYSTEM FOR PLATING SOLUTIONS</b> Belke Mfg. Co., Chicago, Ill. Industrial Filter & Pump Mfg. Co., Chicago, Ill.	<b>GLUE FOR POLISHING</b> Daniels & Orben Co., New York. Divine Bros. Co., Utica, N. Y. Hanson-Van Winkle-Munning Co., Matawan, N. J.	<b>Silver</b> Handy & Harman, New York.
<b>FILTER, TANK</b> Belke Mfg. Co., Chicago, Ill. Industrial Filter & Pump Mfg. Co., Chicago, Ill.	<b>GLUE HEATERS AND POTS</b> Divine Bros. Co., Utica, N. Y. Hanson-Van Winkle-Munning Co., Matawan, N. J.	<b>Tin</b> Ajax Metal, Philadelphia, Pa.
<b>FIRE BRICK</b> Armstrong Cork & Insulation Co., Pittsburgh, Pa.	<b>GOLD</b> (See Anodes; Bars; Metal Dealers; Smelters and Refiners.)	<b>White Metals</b> Michigan Smelting & Refining Co., Detroit, Mich.
<b>FIRE CEMENT</b> Campbell-Hausfeld Co., Harrison, Ohio. Dixon, Joseph, Crucible Co., Jersey City, N. J. Lava Crucible Co., of Pittsburgh, Pittsburgh, Pa. Quigley Furnace Specialties Co., New York.	<b>GRAPHITE PRODUCTS, PHOSPHORIZERS, STIRRERS, ETC.</b> (Also see Crucibles.) Dixon, Joseph, Crucible Co., Jersey City, N. J. McCullough-Dalzell Crucible Co., Pittsburgh, Pa. Naugatuck Valley Crucible Co., Shelton, Conn. Plumbago Crucible Association, The, New York. Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.	<b>INSULATING BRICK, BLOCK, POWDER AND CEMENT</b> (See also Brick.) Armstrong Cork & Insulation Co., Pittsburgh, Pa.
<b>FLOORING COMPOSITION</b> Armstrong Cork & Insulation Co., Pittsburgh, Pa.	<b>GREASELESS COMPOSITIONS</b> Hanson-Van Winkle-Munning Co., Matawan, N. J. Lea Mfg. Co., The, Waterbury, Conn.	<b>INSULATING CEMENT, HEAT</b> Armstrong Cork & Insulation Co., Pittsburgh, Pa. Quigley Furnace Specialties Co., New York.
<b>FLUXES</b> Soldering and Tinning Johnson Mfg. Co., Chicago, Ill.	<b>GRINDERS &amp; BUFFERS</b> Electric Hanson-Van Winkle-Munning Co., Matawan, N. J.	<b>INSULATION</b> (Also see Brick, Insulating, Insulating Cement.) Boiler Armstrong Cork & Insulation Co., Pittsburgh, Pa.
<b>FORGES, BLAST</b> Miner & Peck Mfg. Co., Derby, Conn.		Oven Armstrong Cork & Insulation Co., Pittsburgh, Pa.
<b>FORGINGS</b> (Also see Automobile Forgings.) Aluminum Aluminum Company of America, Pittsburgh, Pa.		Furnace Armstrong Cork & Insulation Co., Pittsburgh, Pa.
<b>FOUNDRY EQUIPMENT AND SUPPLIES</b> (See Kind Wanted.) Campbell-Hausfeld Co., Harrison, Ohio.		Pipe Armstrong Cork & Insulation Co., Pittsburgh, Pa. American Hard Rubber Co., New York, N. Y.
		<b>IRON CASTINGS</b> (See Castings.)
		<b>JAPAN REMOVERS</b> International Chemical Co., Philadelphia, Pa. Magnus Chemical Co., Garwood, N. J. Oakite Products, Inc., New York, N. Y.
		<b>JAPANS, ALL KINDS</b> Zapon Co., The, New York, N. Y.
		<b>JAPANNING BARRELS</b> (See Tumbling Barrels.)

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### JAPANNING OVENS (See Ovens.)

### JEWELERS' EQUIPMENT (Also see Kind Wanted.)

Leman Bros., New York.  
Smith-Richardson Co., Attleboro, Mass.

### JEWELERS' ROLLS (See Rolls.)

### JEWELERS' SOLDER (See Solders.)

### JIGS, FIXTURES, ETC. (See Tools, Jigs, Fixtures.)

### LABORATORY WARE

Norton Co., Worcester, Mass.

### LABORATORIES

(See Testing Laboratories.)

### lacquering barrels (See Tumbling Barrels.)

### LACQUER ENAMELS (See Enamels.)

Nikolas & Co., G. J., Inc., Chicago, Ill.

Walker, Henry V., Co., New York.

Waukegan Chemical Co., Waukegan, Ill.

Zapon, The, Co., Stamford, Conn.

Zeller Lacquer Mfg. Co., New York.

### LACQUERS

#### Colored

Egyptian Lacquer Mfg. Co., New York.

Mans & Waldstein Co., Newark, N. J.

Nikolas & Co., G. J., Chicago, Ill.

Roxalin Flexible Lacquer Co., Long Island City, N. Y.

Walker, Henry V., Co., New York.

Waukegan Chemical Co., Waukegan, Ill.

Zapon, The, Co., Stamford, Conn.

Zeller Lacquer Mfg. Co., New York.

#### For Incandescent Lamps

Egyptian Lacquer Mfg. Co., New York.

Zapon, The, Co., Stamford, Conn.

Anderson Chemical Co., New York.

Apothecaries Hall Co., Waterbury, Conn.

Egyptian Lacquer Mfg. Co., New York.

Mans & Waldstein Co., Newark, N. J.

Nikolas & Co., G. J., Chicago, Ill.

Roxalin Flexible Lacquer Co., Long Island City, N. Y.

Walker, Henry V., Co., New York.

Waukegan Chemical Co., Waukegan, Ill.

Zapon, The, Co., Stamford, Conn.

Zeller Lacquer Mfg. Co., New York.

#### Wood

Anderson Chemical Co., New York.

Egyptian Lacquer Mfg. Co., New York.

Nikolas & Co., G. J., Inc., Chicago, Ill.

Roxalin Flexible Lacquer Co., Long Island City, N. Y.

Walker, Henry V., Co., New York.

Waukegan Chemical Co., Waukegan, Ill.

Zapon, The, Co., Stamford, Conn.

Zeller Lacquer Mfg. Co., New York.

### LACQUER REMOVERS

Egyptian Lacquer Mfg. Co., New York.

International Chemical Co., Philadelphia, Pa.

Magnus Chemical Co., Garwood, N. J.

Nikolas & Co., G. J., Inc., Chicago, Ill.

Roxalin Flexible Lacquer Co., Long Island City, N. Y.

Zapon, The, Co., Stamford, Conn.

### LACQUER SPRAYERS (See Sprayers.)

Economy Machine Products Co., Chicago, Ill.

### LACQUERING

Merch Plating Equipment Co., Chicago, Ill.

### LADLE HEATERS AND DRYERS

Monarch Engineering & Mfg. Co., Baltimore, Md.

### LATHES (See also Polishing Lathes.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Electric

Hill Curtis Co., Kalamazoo, Mich.

Polishing

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Hill Curtis Co., Kalamazoo, Mich.

Metal Spinning and Wood Turning

Prybil, P., Machine Co., New York.

### LEAD BURNING

Abernethy, John F. & Co., Inc., Brooklyn, N. Y.

### LEAD-LINED TANKS (See Tanks.)

### LEATHER POLISHING WHEELS (See Buffing and Polishing Wheels.)

### LOCOMOTIVES, INDUSTRIAL (See Electric Locomotives.)

### LUBRICANTS, Cutting and Grinding, Drawing, Stamping

International Chemical Co., Philadelphia, Pa.

Oakite Products, Inc., New York, N. Y.

### MACHINERY

#### Cleaning Metal (Mech.)

Colt Patent Fire Arms Mfg. Co., Hartford, Conn.

Ideal Industrial Machinery Co., Cincinnati, Ohio.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.

### Dry Metal (Mech.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.

### Metal Drying

Ideal Industrial Machinery Co., Cincinnati, Ohio.

### Pickling Metal (Mech.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Ideal Industrial Machinery Co., Cincinnati, Ohio.  
U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.

### Galvanizing (Mech.)

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### Plating (Mech.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.

### MAGNETIC SEPARATORS (See also reclaiming Machinery.)

### MANGANESE

Metal & Thermit Corp., New York.

### MANGANESE-COPPER (Also see Ingots.)

Ajax Metal Co., Philadelphia, Pa.  
Metal & Thermit Corp., New York.

### MANTLE DIP

Zapon Co., The, New York.

### MELTING FURNACES (Also see Burners; Galvanizing and Tinning Furnaces; Tank Furnaces.)

Campbell-Hausfeld Co., Harrison, Ohio.

### Coal and Coke

Monarch Engineering & Mfg. Co., Baltimore, Md.

### Oil or Gas

Campbell-Hausfeld Co., Harrison, Ohio.

Johnson Gas Appliance Co., Cedar Rapids, Ia.

Monarch Engineering & Mfg. Co., Baltimore, Md.

### Pit

Monarch Engineering & Mfg. Co., Baltimore, Md.

Stevens, Inc., Frederic B., Detroit, Mich.

### Reverberatory

Monarch Engineering & Mfg. Co., Baltimore, Md.

### METAL BRIQUETTES (See Briquet-Ingots.)

### METAL CLEANERS (See also Cleaning Compounds.)

Cowden Detergent Co., Cleveland, Ohio.

Ford, J. B., Co., Wyandotte, Mich.

Fuller, W. A., Co., Greensburg, Pa.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

International Chemical Co., Philadelphia, Pa.

MacDermid, Inc., Waterbury, Conn.

Magnus Chemical Co., Garwood, N. J.

Magnus Products Corp., Brooklyn, N. Y.

Oakite Products, Inc., New York, N. Y.

Sulphur Products Co., Greensburg, Pa.

### METAL DEALERS (Also see Drosses, Residues, Etc.; Buyers of; Turnings, Chips, Etc.; Buyers of.)

#### Gold, Silver, Platinum

Radnal, Josef, New York.

Roessler and Hasslacher Chemical Co., New York.

#### New Metals

Trotter, Nathan & Co., Philadelphia, Pa.

#### Old Metals

Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.

#### Rare Metals

Radnal, Josef, New York.

### METAL DRYERS, CENTRIFUGAL

Ideal Industrial Machinery Co., Cincinnati, Ohio.

Tolhurst Machine Works, Troy, N. Y.

### METAL GOODS MADE TO ORDER (Also see Stamping and Drawing.)

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

### METAL POLISH

Lea Mfg. Co., Waterbury, Conn.

Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. J.

### METAL RECLAIMING EQUIPMENT (See Concentrating Tables; Crushers and Pulverizers; Magnetic Separators.)

### METAL SPECIALTIES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

### METALS (See also Kinds Wanted. Also Metal Dealers.)

#### Acid Resistant

The Duriron Co., Dayton, Ohio.

### Bearing

American Brass Co., Waterbury, Conn.

### Extruded and Die Pressed

American Brass Co., Waterbury, Conn.

### METALS, PLATED SHEET (See Plated and Polished Sheet Metals; Sheets.)

### METALS, RARE (See Metal Dealers.)

### METERS — ELECTRICAL MEASURING —

Wilson Macaulay Co., Inc., New York.

### MILLS CRUSHING (See also Crushers and Pulverizers.)

### MOLD DRYERS, PORTABLE

Monarch Engineering & Mfg. Co., Baltimore, Md.

### MOLDING MACHINES

#### Power

Turner Foundry & Machine Co., Philadelphia, Pa.

### MOLDING SAND (See Sand.)

### MOLDINGS & EXTRUDED SHAPES

#### Aluminum

Aluminum Company of America, Pittsburgh, Pa.

### MOLDS (See also Mold Makers.)

#### Babbitt and Solder

Fanning, J. P., Co., Brooklyn, N. Y.

Schweizer, Chas. K., St. Louis, Mo.

#### Ingot

Fanning, J. P., Co., Brooklyn, N. Y.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

Schweizer, Chas. K., St. Louis, Mo.

### MOLD SPRAYERS (See Sprayers.)

### MOTOR CONTROL EQUIPMENT (See also Electrical Apparatus and Equipment.)

### MOTORS (Also see Electrical Apparatus and Equipment.)

Eager Electric Co., Watertown, N. Y.

Electric Products Co., The, Cleveland, O.

#### Electric

Chandeysson Electric Co., St. Louis, Mo.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

### MOTOR-GENERATOR SETS (See Dynamos; Electrical Apparatus and Equipment.)

Boissier Electric Co., New York.

Chandeysson Electric Co., St. Louis, Mo.

Crown Rheostat & Supply Co., Chicago, Ill.

Eager Electric Co., Watertown, N. Y.

Electric Products Co., The, Cleveland, O.

Green, W., Electric Co., New York, N. Y.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Jants & Leist Electric Co., Cincinnati, Ohio.

Stuts, Geo. A., Mfg. Co., Chicago, Ill.

#### Plating and Galvanizing

Hanson-Van Winkle-Munning Co., Matawan, N. J.

U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.

### MUFFLES

Dixon, Joseph, Crucible Co., Jersey City, N. J.

### MUNTZ METAL (See Sheets.)

### NICKEL (See Anodes; Castings; Sheets; Wire; Etc.)

### NICKEL CARBONATE, MOIST AND DRY

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

Roessler & Hasslacher Chemical Co., New York.

### NICKEL CHLORIDE

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

Roessler & Hasslacher Chemical Co., New York.

### NICKEL PLATING

Slevering, Philip, Inc., New York, N. Y.

### NICKEL SALTS

Apothecaries Hall Co., Waterbury, Conn.

Buchanan, Thos., Co., Cincinnati, Ohio.

Crown Rheostat & Supply Co., Chicago, Ill.

Daniels & Orben Co., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.

MacDermid Incorporated, Waterbury, Conn.

Roessler & Hasslacher Chemical Co., New York.

Stevens, Frederic B., Detroit, Mich.

### NICKEL SHOT

Seymour Mfg. Co., Seymour, Conn.

### NICKEL SILVER (See also Brass, Sheets, Wire, Rod, Tube Castings; Forgings, Sheets;

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<b>NICKEL SULPHATE, SINGLE AND DOUBLE</b> Harshaw, Fuller & Goodwin Co., Cleveland, Ohio.	<b>PLATING BARRELS, ROTARY</b> Lassico, Inc., St. Louis, Mo. Meeker, The Co., Chicago, Ill. Plating Chemicals Wilkes-Martin-Wilkes Co., New York, N. Y.	<b>POLISHING MACHINES (Also see Polishing Lathes and Heads)</b> Automatic Acme Mfg. Co., Detroit, Mich. Hanson-Van Winkle-Munning Co., Matawan, N. J.
<b>OIL BURNERS (See Burners.)</b>	<b>PLATING AND GALVANIZING BARRELS</b> Connecticut Dynamo & Motor Co., Irvington, N. J. Daniels & Orben Co., Inc., New York. Hanson-Van Winkle-Munning Co., Matawan, N. J. Meeker, The Co., Chicago, Ill. Stutz, Geo. A., Mfg. Co., Chicago, Ill. U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.	<b>POLISHING MATERIALS</b> Keystone Emery Mills, Philadelphia, Pa. Zucker Sons Co., Inc., Roselle, N. J.
<b>OIL PUMPS (See also Oil Storage Systems.)</b> Monarch Engineering & Mfg. Co., Baltimore, Md.	<b>PLATING AND GALVANIZING MACHINES, AUTOMATIC (Also see Plating Barrels.)</b> Hanson-Van Winkle-Munning Co., Matawan, N. J. Lassico, Inc., St. Louis, Mo. Meeker, The Co., Chicago, Ill. U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.	<b>POLISHING MOTORS, ELECTRIC (See Polishing Lathes.)</b> Green, W., Electric Co., New York, N. Y.
<b>OLD METALS (See Drosses, Residues, Etc., Buyers of; Metal Dealers.)</b>	<b>PLATING, BARREL METHOD, JOB AND CONTRACT (See Electrotyping.)</b> Merch Plating Equipment Co., Chicago, Ill.	<b>POLISHING AND BURNISHING; JOB AND CONTRACT (See also Electro Plating.)</b>
<b>OVENS (Also see Burners; also Core Ovens.)</b> Enameling, Lacquering, Japanning Kirk & Blum Mfg. Co., Cincinnati, Ohio. Steiner & Co., E. M., Newark, N. J.	<b>PLATING EQUIPMENT AND SUPPLIES</b> (See also Kind Wanted.) Daniels & Orben Co., Inc., New York, N. Y. Hanson-Van Winkle-Munning Co., Matawan, N. J. Lustre Co., Inc., The, St. Louis, Mo. U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.	<b>POLISHING AND GRINDING ENGINEERS</b> (See Engineers.) Divine Bros. Co., Utica, N. Y. Metal Finishers Mach. Co., Cleveland, Ohio.
<b>OVEN BURNERS (See Burners.)</b>	<b>PLATING GENERATORS</b>	<b>POLISHING WHEELS (See Buffing and Polishing Wheels.)</b> Advance Wheel Mfg. Co., Chicago, Ill. Allied Industrial Products Co., Chicago, Ill. Divine Bros. Co., Utica, N. Y. Hanson-Van Winkle-Munning Co., Matawan, N. J. Chas. F. L'Hommedieu & Sons, Chicago, Ill. Yerger Buff Co., Toledo, Ohio.
<b>OVEN INSULATION (See Brick, Insulating; Insulating Cement; Insulation.)</b>		<b>POTASH</b> First Sorts International Chemical Co., Philadelphia, Pa. Real International Chemical Co., Philadelphia, Pa.
<b>OXIDIZING SOLUTIONS</b> Sulphur Products Co., Greensburg, Pa.		<b>POTASSIUM CYANIDE</b> Roessler & Hasslacher Chemical Co., New York.
<b>PANELS</b> Bakelite Merch Plating Equipment Co., Chicago, Ill.		<b>POWDERED COAL BURNERS (See Burners.)</b>
<b>PAINT SPRAYERS (See Sprayers.)</b>		<b>POWDERED METALS</b> Aluminum Aluminum Company of America, Pittsburgh, Pa.
<b>PATTERN SHOP EQUIPMENT (See Lathes; Saws.)</b>		<b>PRESSES (Also see Scrap Baling Machine.)</b>
<b>PAVING BRICK, CORK (See Brick.)</b>		Bench and Foot Baird Machine Co., Bridgeport, Conn. Shuster, F. B., Co., New Haven, Conn.
<b>PHOSPHOR BRONZE (See also Ingots.)</b> Ajax Metal Co., Philadelphia, Pa. Western Cartridge Co., Alton, Ill.		Cabbing Farrel-Birmingham Co., Inc., Ansonia, Conn.
<b>PHOSPHORIZERS (See Graphite Products.)</b>		Hydraulic Watson-Stillman Co., New York.
<b>PHOSPHOR-COPPER (Also see Ingots.)</b> Ajax Metal Co., Philadelphia, Pa.		Power, All Types Baird Machine Co., Bridgeport, Conn. Farrel-Birmingham Co., Inc., Ansonia, Conn. Miner & Peck Mfg. Co., Derby, Conn.
<b>PHOSPHOR-COPPER, BORONIC</b> American Boron Products Co., Buffalo, N. Y.		<b>PRESSES, DROP LIFTERS FOR</b> Miner & Peck Mfg. Co., Derby, Conn.
<b>PHOSPHOR-TIN (See also Ingots.)</b> Ajax Metal Co., Philadelphia, Pa.		<b>PRESSURE BLOWERS (See Blowers and Blow-Piping.)</b>
<b>PHOSPHORUS</b> General Chemical Co., Philadelphia, Pa.		<b>PULVERIZERS</b> Standard Equipment Co., New Haven, Conn.
<b>PICKLING TANKS</b> American Hard Rubber Co., New York, N. Y. General Ceramics Co., New York, N. Y.		<b>PUMICE</b> National Pumice Stone Co., New York.
<b>PIPE ALUMINUM</b> Aluminum Company of America, Pittsburgh, Pa.		<b>PUMICE STONE</b> National Pumice Stone Co., New York.
<b>PIPE, BRASS AND COPPER</b> American Brass Co., Waterbury, Conn.		<b>PUMPS</b> Centrifugal, Acid Proof Duriron, The Co., Inc., Dayton, Ohio.
<b>PIPE AND BOILER COVERINGS, STEAM, ICE WATER, BRINE (See also Insulation.)</b> Armstrong Cork & Insulation Co., Pittsburgh, Pa.		Hard Rubber, Acid Proof American Hard Rubber Co., New York.
<b>PIPE AND FITTINGS</b> Acid Proof Duriron, The Co., Inc., Dayton, Ohio.		Reciprocating, Acid Proof Duriron, The Co., Inc., Dayton, Ohio.
Acid Proof American Hard Rubber Co., New York.		<b>PYROMETERS</b> Thwing Instrument Co., Philadelphia, Pa. Wilson-Maeulen Co., Inc., New York, N. Y.
<b>PISTON, RODS, TOBIN BRONZE</b> American Brass Co., Waterbury, Conn.		<b>RACKS—Rubber Covering for</b> American Hard Rubber Co., New York. Chicago Hard Rubber Supply Co., Chicago, Ill.
<b>PLATED AND POLISHED SHEET METALS (See also Sheets.)</b> American Nickeloid Co., Peru, Ill.		<b>RECLAIMING MACHINERY; METAL</b> (Also see Concentrating Tables; Crushers and Pulverizers; Magnetic Separators.) Eastern Machinery Co., New Haven, Conn. Standard Equipment Co., New Haven, Conn.
<b>PLATERS' BRUSHES (See Brushes.)</b>		<b>RECORDING INSTRUMENTS</b> Thwing Instrument Co., Philadelphia, Pa.
<b>PLATERS' BUCKETS, DIPPERS &amp; PITCHERS</b> Belke Mfg. Co., Chicago, Ill. Industrial Filter & Pump Mfg. Co., Chicago, Ill.		
<b>PLATERS' COMPOUND (See Whale Oil Soap.)</b>		
<b>PLATING</b> American Hard Rubber Co., New York, N. Y. General Chromium Corp., Detroit, Mich. New Haven Sherardizing Co., Hartford, Conn. U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.		
Cadmium New Haven Sherardizing Co., Hartford, Conn.		
Contract Hoover, Philip, Inc., New York, N. Y.		

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REFINERS AND SMELTERS (See Smelters and Refiners.)	SAND SIFTERS Turner Foundry & Machine Co., Philadelphia, Pa.	SHERARDIZING FURNACES AND EQUIPMENT New Haven Sherardizing Co., Hartford, Conn.
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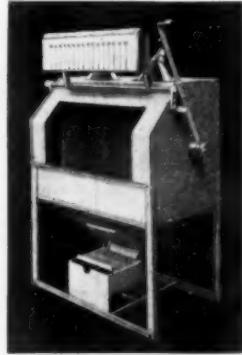
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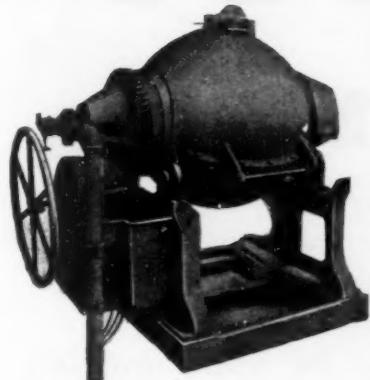
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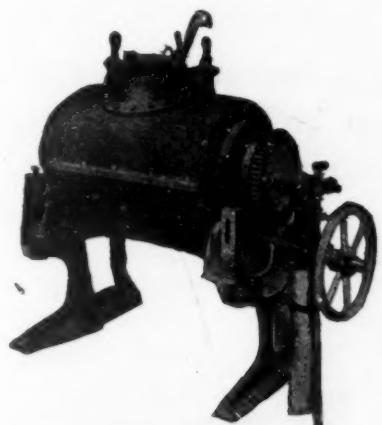
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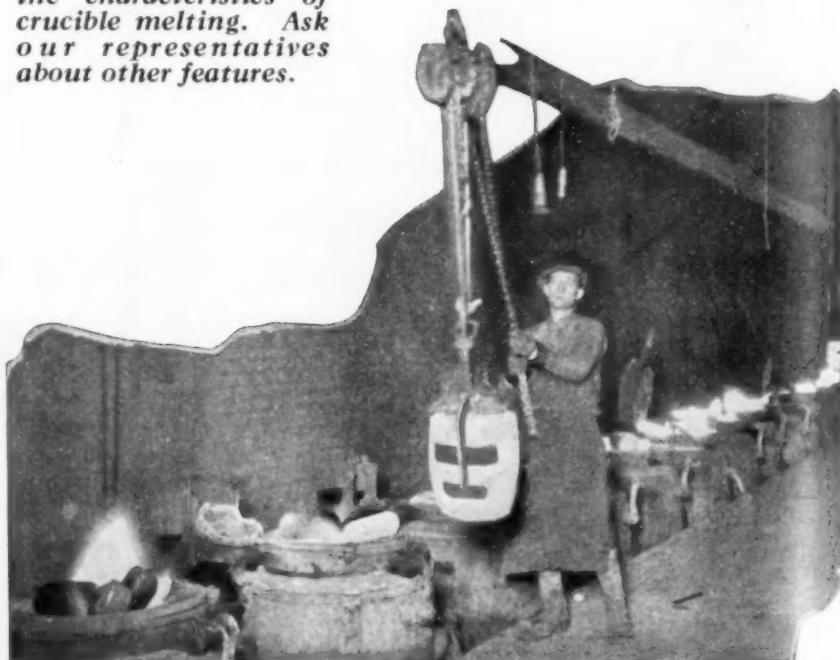
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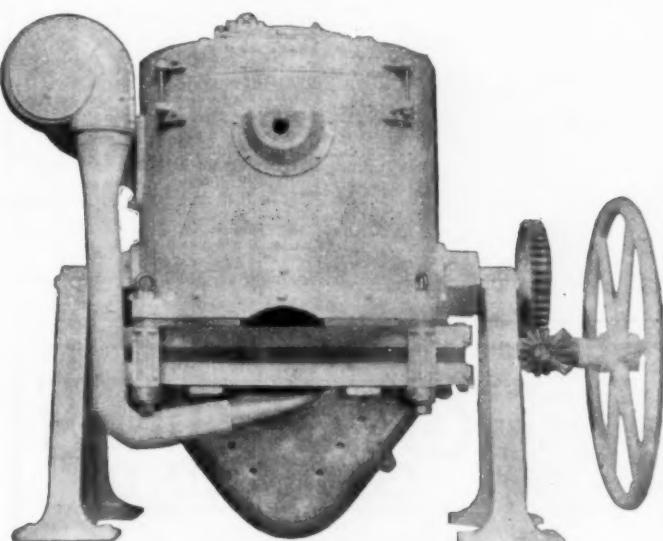
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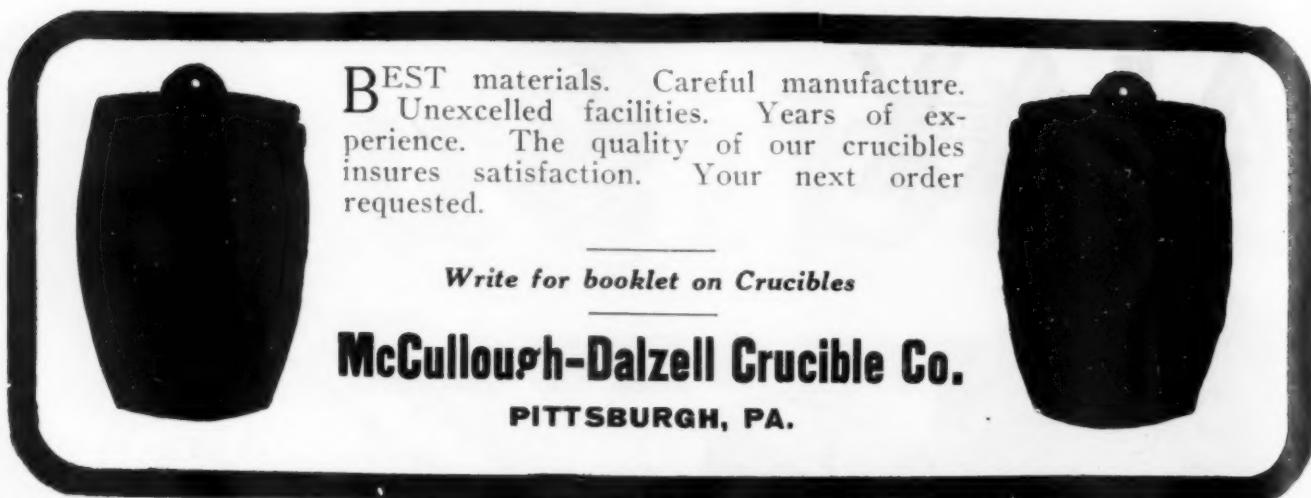
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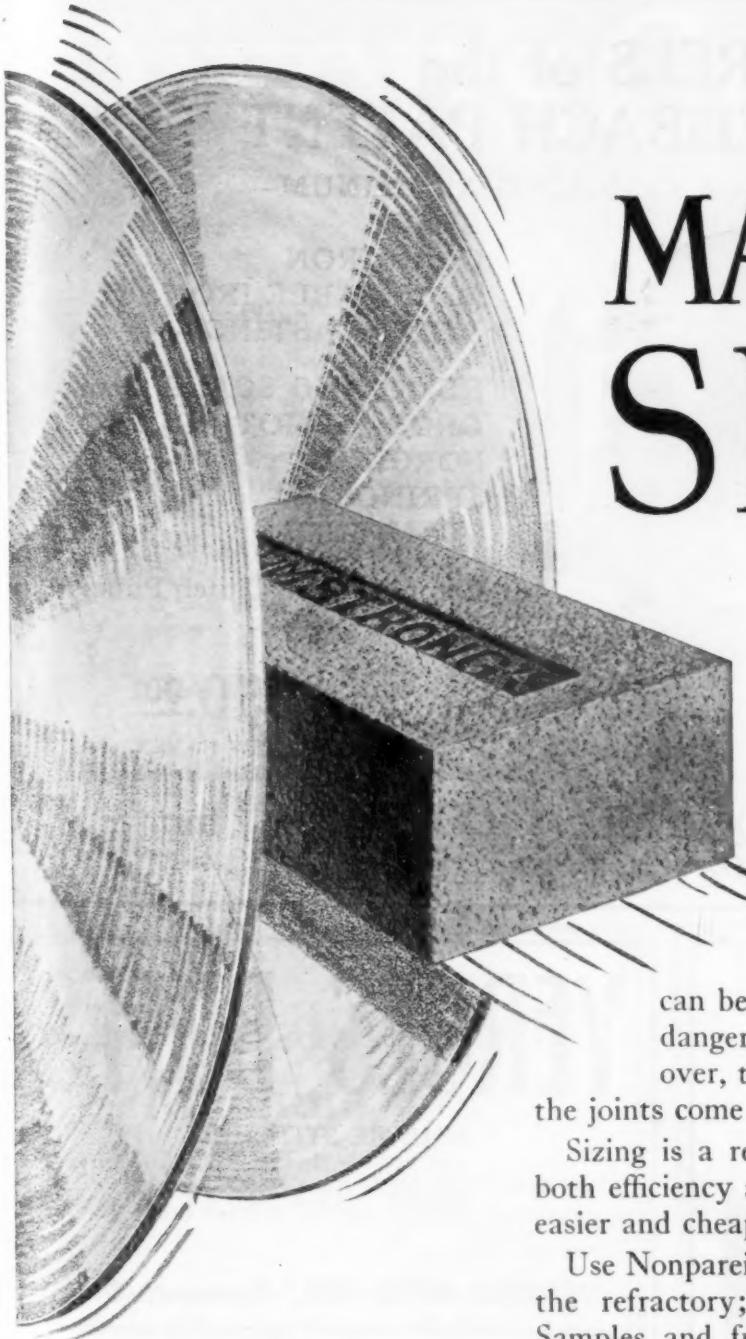
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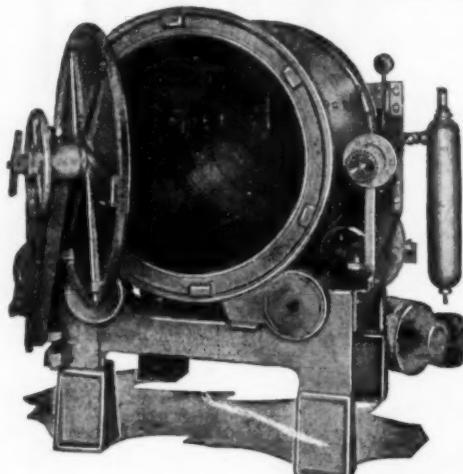
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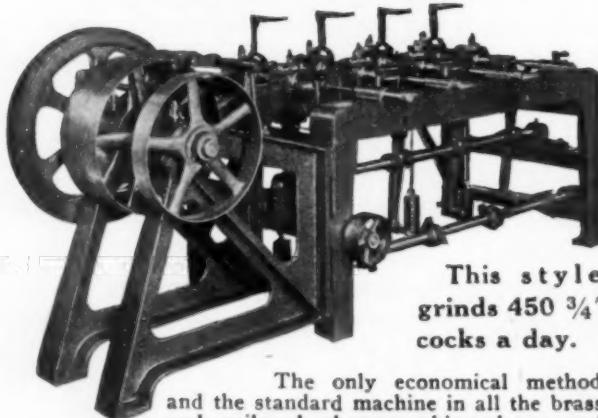
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Before me, a Notary Public in and for the State and County aforesaid, personally appeared Thomas A. Trumbo, who, having been duly sworn according to law, deposes and says that he is the business manager of THE METAL INDUSTRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

- That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Palmer H. Langdon, 11 Clinton Street, New York City. Editor, Palmer H. Langdon, 99 John Street, New York City. Managing editor, Adolph Bregman, 99 John Street, New York City. Business manager, Thos. A. Trumbo, 99 John Street, New York City. Advertising manager, Evan J. Robinson, 99 John Street, New York City.
- That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) The Metal Industry Publishing Co., 99 John Street, New York City; Palmer H. Langdon, 99 John Street, New York City; L. J. Langdon, 99 John Street, New York City; Thos. A. Trumbo, 99 John Street, New York City.
- That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.
- That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

THOMAS A. TRUMBOUR, Business Manager.  
Sworn to and subscribed before me this 8th day of October, 1928.

(Seal) W. H. MILLEKIN,  
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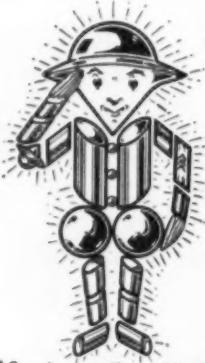
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"Several tests have been made with this Chromium Composition in polishing chromium plated deposits to a high luster, and we can frankly state that in our personal opinions from such tests made, it is the very best material we have used."

THE  
MATCHLESS METAL  
POLISH COMPANY

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# KALYE

(Trade Mark)

FOR PREPARING METAL  
SURFACES FOR PLATING, &c.  
SAMPLE CAN SENT FREE

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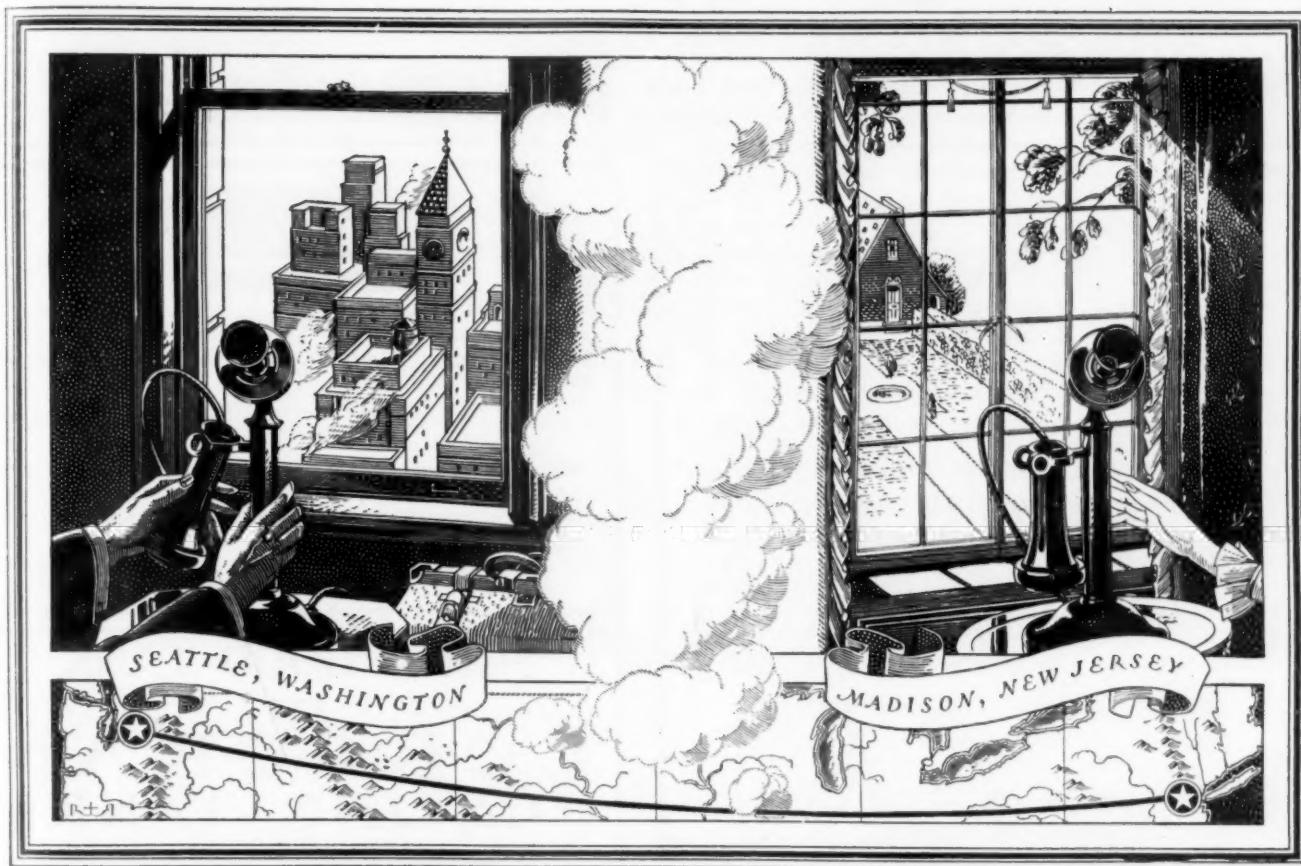


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Brass, Copper and Steel Wire Brushes  
An assortment of  
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Repairs Promptly Attended to

H. BLUMENTHAL & CO., MFRS.  
ANDREW H. LAU, Sole Proprietor  
241-243-245 CENTRE ST., NEW YORK  
Ask for Catalog "M"

# “Setting Free the Mind as by a Miracle”



## ■ An Advertisement for Bell Long Distance Telephone Service

IN SEATTLE, Washington, far from home. Homesick. Lingering doubts and apprehension about the welfare of his family in Madison, N. J., 3000 miles away.

He filed a telephone call, and a few minutes later the operator signaled.

A crisp, "Go ahead, please!" and then across the plains, mountains and valleys came to him the reassuring tones of a familiar voice.

"Setting free the human mind as by a miracle," is how this man describes long distance calls.

And business doubts are banished just as quickly. Whether in business or personal matters, telephone calls will quickly

clear the worries off your desk and out of your mind. You will be surprised how little long distance calls cost.

Under the new station to station day rates, Los Angeles to Chicago is only \$6.25. Denver to St. Louis, \$3.50. Miami to Atlanta, \$2.80. Dallas to New Orleans, \$2.20. Pittsburgh to Cleveland, 80c. Atlantic City to New York, 70c. Baltimore to Philadelphia, 70c. What distant calls could you make to advantage, now?

The station to station day rate from the Statue of Liberty to the Golden Gate is only \$9.00. . . . Calling by number takes less time. . . . . Number, please?



## HYDRAULIC PRESSES

FOR  
DIE SINKING, PRESSING, EMBOSsing, SHEET METAL  
FORMING, DRAWING, CUPPING, FLANGING, BENDING  
AND EXTRUDING

Our line of presses contains many machines built for the working of metals. We build everything necessary to equip complete hydraulic plants—pipe, valves, pumps, accumulators, packing, etc.

WRITE FOR CATALOGS

THE WATSON-STILLMAN COMPANY

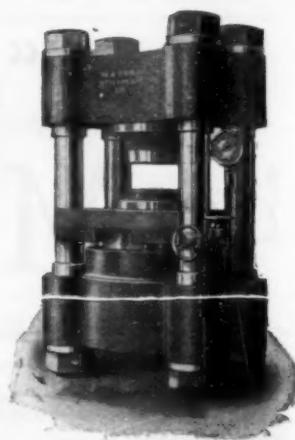


14 Carlisle St., New York

Chicago Cleveland Detroit Richmond Philadelphia St. Louis



359



## Chromium Plating

In the last three months more manufacturers have adopted our process than in any previous quarter. What better proof could there be of the success of our methods and the attractiveness of our proposition?

Let us show you how our clients are producing chromium plating of the highest quality at remarkably low costs.

Patent protection guaranteed—No royalties required.

WEISBERG & GREENWALD

Engineers—Chemists

71 West 45th St.  
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5 POUNDS  
We fill orders

TRI-B  
BRAND

OR 5 TONS  
for any amount

DO you save cents and waste dollars?  
Adopt up-to-the-minute production  
methods and use

BUCHANAN'S BUCO

for rust proofing all steel parts. Get a hard, transparent film that won't rub off, but easily removed with gasoline or cleaners.

Information, prices and samples for the asking.

ASK YOUR JOBBER OR THE  
C.G. BUCHANAN CHEMICAL CO.  
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### POLISHING GRAIN

For Polishing with "set up" wheels use Borolon Grain, an aluminous abrasive.

Borolon Grain cuts faster and lasts longer because it is sharp, hard and uniform in size and temper.



Write for booklet "Borolon Polishing Grain."

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## CORCORAN PLATING TANKS



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COPPER—CYANIDE—ZINC—CADMIUM—BRASS

We have PERFECTED a COMPOUND which gives a brilliant luster and eliminates coloring after electroplating. Any standard solution can produce a bright finish by using a small amount of these brighteners.

Write for full information to

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BRIGHTENERS

We are successfully Chromium Plating Aluminum on a Production basis.

ATLAS PLATING WORKS, INC.  
277 E. 156th STREET, CLEVELAND, OHIO

Production—"CRODON," Nickel, Cadmium, Zinc and Copper—Mechanical Plating and Burnishing

# A Farrel-Birmingham Rolling Mill Designed to Minimize Noise and Vibration and Reduce Power Consumption and Maintenance

Noise and vibration in Rolling Mills may be caused in part by inaccuracy or misalignment of gearing, by improper clearance in moving parts (between journals and bearings, for example), by inefficient lubrication of bearings and by unsupported rough wobbler couplings connecting pinions with rolls. The Farrel-Birmingham Zinc Rolling Mill illustrated below has been designed to overcome these defects to a large degree.

The gears in the Reduction Drive as well as the Mill Pinions are accurately generated with Farrel-Sykes, double helical, continuous teeth for smooth running and they are made of steel of a quality to insure long life. The Reduction Gears and Mill Pinions are fully enclosed and are lubricated by continuous streams of oil sprayed against the teeth. The bearings are the sleeve type, designed for a principle of lubrication which has proved its effectiveness in maintaining an oil film between journal and bearing. The journals literally "float on oil" and consequently bearing friction is greatly lessened.

The spindles, instead of depending for support only upon the rough fit in the coupling boxes, have grooves

machined in the middle and are supported by spring-cushioned arms with babbitted bearing surfaces which carry their weight and absorb shocks.

The combination of these improvements results in smooth and quiet running far in advance of ordinary practice. The friction loss is cut in half and there is a saving of 25% in the horsepower required. It will also be recognized that these features effect a material saving in maintenance cost through lessening wear and tear, less frequent replacement of parts and fewer and shorter shut-down periods.

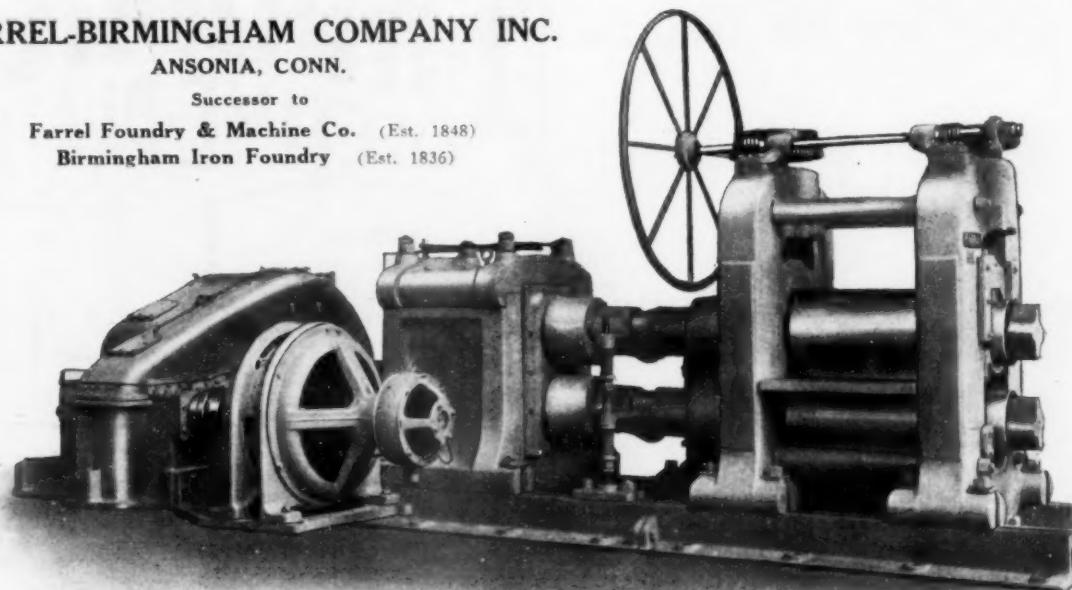
The qualities of smoothness and quietness of operation, and savings in power and maintenance costs can be greatly enhanced by equipping the Mills throughout with Roller Bearings and Universal Joints, which we have done to advantage in other cases.

Anyone interested in equipment for reducing rolling costs of non-ferrous metals can obtain from Farrel-Birmingham engineers detailed data relating to costs, operation, etc., which will be helpful in the consideration of new installations and making comparisons with present equipment and methods.

**FARREL-BIRMINGHAM COMPANY INC.**  
ANSONIA, CONN.

Successor to

**Farrel Foundry & Machine Co.** (Est. 1848)  
**Birmingham Iron Foundry** (Est. 1836)



# FARREL-BIRMINGHAM

# Advance Polishing Wheels

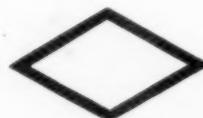


BRANDED WITH A DIAMOND

They Must Be Good



Look for the Diamond



Manufactured By

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Manufacturers of Polishing Wheels For All Industries

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1857-1928

*Manufacturing Platers' Chemicals*

## CHROMIC ACID

For the new method of plating

Does not tarnish

Does not corrode

Requires NO Polishing

CHROMIC Chloride  
Carbonate  
Sulphate

## COPPER CARBONATE

53 to 55% Metallic Copper

## SILVER CHLORIDE

and a full line of

PLATERS' CHEMICALS

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CHEMICALS

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N. J.

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1857  
to  
1928

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We have installed  
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Plants for manufac-  
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in New York City  
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area, using our  
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Process. These  
plants are operating  
on a profitable, suc-  
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Problems Solved!

Manufacturers who are not  
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Our "PLATCHROME"  
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process gives **rust and heat  
resistance, hardness** and a  
permanent, brilliant finish.  
*Let us quote you prices on your  
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this Platchrome process in  
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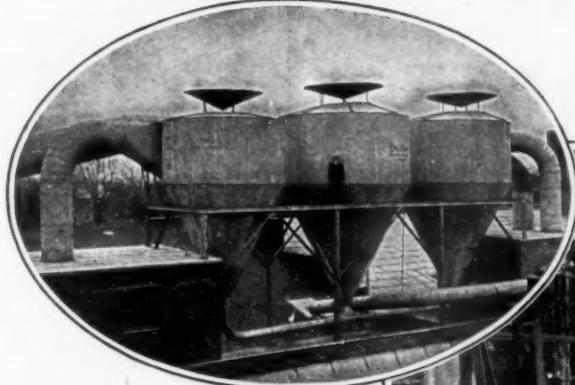
**CHROMIUM ENGINEERING CORPORATION  
OF AMERICA**

246 FIFTH AVE.

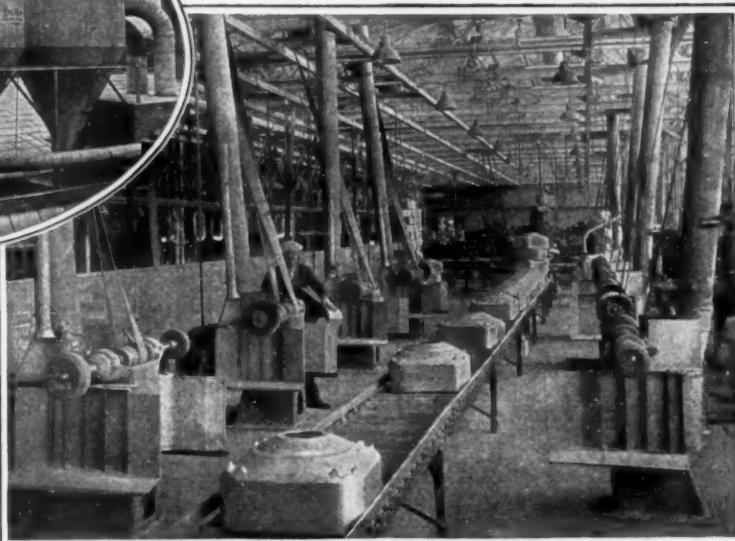
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The most interesting of recent dust collecting applications in grinding rooms.



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If you use blower equipment in your plant this book "Blower Systems" will prove helpful to you. Describes approved design of blower equipment in wood-working and metal-working plants, glass, chemical, and other industries. Just mail the coupon.



**Chooses Kirk & Blum and says:**

"In our grinding and polishing department where more than half a million aluminum castings are polished monthly, 2 tons of dust are collected every 9 hours from 120 polishing lathes and 40 belt grinders.

"Formerly 5 men worked 11 hours every night cleaning this department.

"Production has been increased 20%, it is estimated, as the direct

result of a clean shop; and reduced repairs and maintenance of machines, bearings and motors secured by highly efficient Kirk & Blum systems will rapidly wipe out the installation cost. Several K & B installations, including that of the Ford Motor Co., were inspected before choosing Kirk & Blum systems, and inquiries made to other owners brought recommendations from all."

Check and mail the coupon for copy of complete report on this Kirk & Blum installation at Maytag and copy of the book "Blower Systems."

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# KIRK & BLUM

## Blower Systems

**with a definite power guarantee  
in every proposal**

**The Kirk & Blum Manufacturing Co.  
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Plant report The Maytag Company  
 Other plant reports by executives, on dust collecting installations  
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# CHROMIC ACID

## 99 3/4%

In the light of present knowledge it is quite evident that many of the baffling failures in Chrome plating in the past were due to impurities, some of which need only to be present in minute traces to cause disastrous results.

Few, if any, industries are so dependent upon the purity of material as are the Chrome Platers. You can very easily safeguard against the possibility of failure by using Mutual Chromic Acid 99 3/4%.

**MUTUAL CHEMICAL CO., OF AMERICA**  
**270 MADISON AVE., NEW YORK, N. Y.**

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**The Largest Producers of Bichromates in the World**

ESTABLISHED 1847

*On an industrial scale we are  
pioneers in the production of*

**CHROMIC ACID**  
 for  
**ELECTROPLATING**

Our Chromic Acid is  
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*Send for samples*

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 MANUFACTURING CHEMISTS

SUCCESSORS TO

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SODIUM CYANIDE "Aeroids"  
 96/98% sodium cyanide— $\frac{1}{2}$  ounce ball form  
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 70/71% metallic copper  
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 55/55 1/2% metallic zinc  
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 94/96% potassium cyanide—single salt in  
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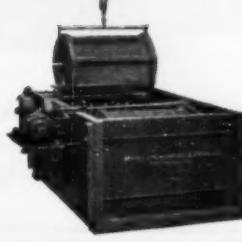
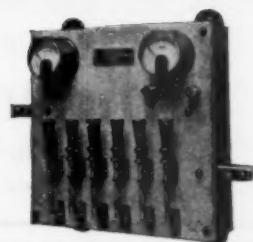
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EVERYTHING IN EQUIPMENT AND SUPPLIES FOR CHROMIUM—NICKEL—COPPER—BRASS—CADMIUM—TIN—SILVER OR GOLD PLATING

# for Platers and Polishers

*A clear, concise treatise  
on the many problems  
that arise in plating and  
polishing plants*

**Write for Your  
Copy**

**The Material Best Suited to  
Handle Your Product.**

There is one "best" way  
to produce a high finish  
—and it is always the  
cheapest and quickest in the long run.

Each unit in the Reliance line of Compositions has a particular place in polishing and buffing—and it is the finest, most scientifically correct composition which L'Hommedieu chemists have been able to develop. It represents the "best" way to complete a particular operation and cut down all waste efforts and excessive costs.

Reliance Bulletin No. 101 explains in a practical way how to improve shop methods, reduce rejections and improve quality. Your copy is waiting.



## BELKE PRODUCTS

*Are necessary in every plating plant.*

Every single item will pay for itself several times in the course of a year, in one or more of the following ways:

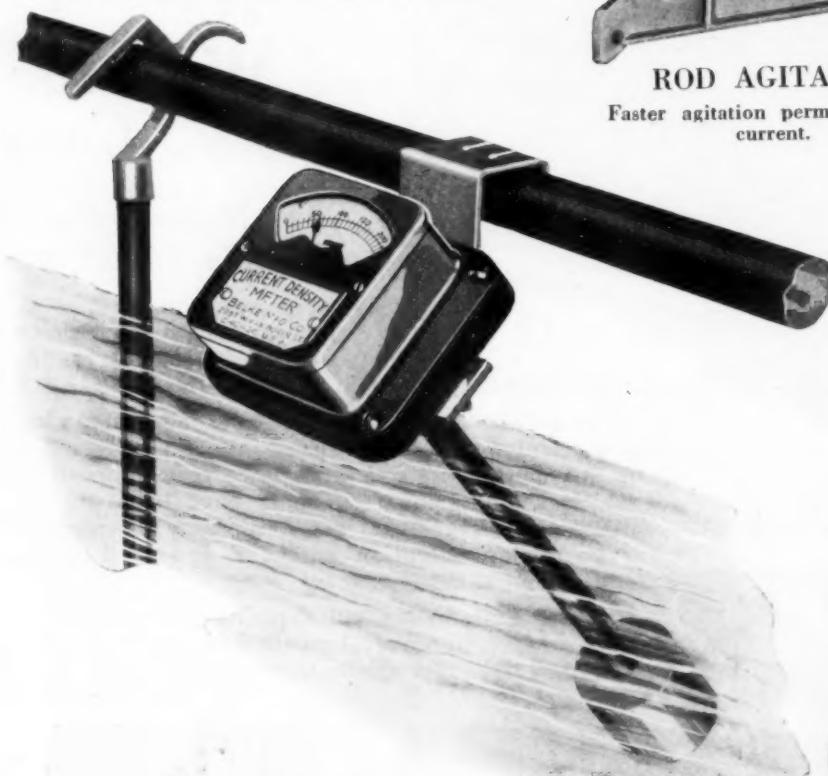
By Saving Current  
By Saving Time  
By Saving Metal

By Saving Upkeep Cost  
By Saving Labor  
By Eliminating Rejections.

### CURRENT DENSITY METER

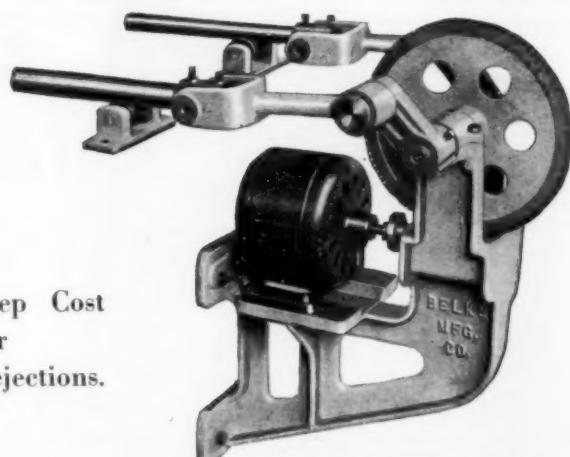
Know how many amperes you are plating per sq. ft.

This will insure you a uniform product and save you from either overplating and wasting time, metal and output or under-plating with rejected work.



### MICARTA PLATING BASKETS

With removable bottoms. These baskets last a lifetime and stay light and easy to handle.



### ROD AGITATOR

Faster agitation permits heavier current.



### ELECTRIC SOLUTION HEATERS

Belke Electric Solution Heaters are designed to be operated from the light socket, and to be used on plating solutions.

They will keep the solutions warm over night. A warm plating bath means faster and better deposit. Start plating efficiently at 8 o'clock in the morning.

Use Belke's Solution Heaters.

**BELKE MFG. COMPANY**  
2952 W. Van Buren Street Chicago, Ill.  
*Send for our new catalog*

## BELKE PRODUCTS

*are the most widely recommended,  
the most popular  
and the most talked  
of because every  
article is new—  
original and evolutionary.*

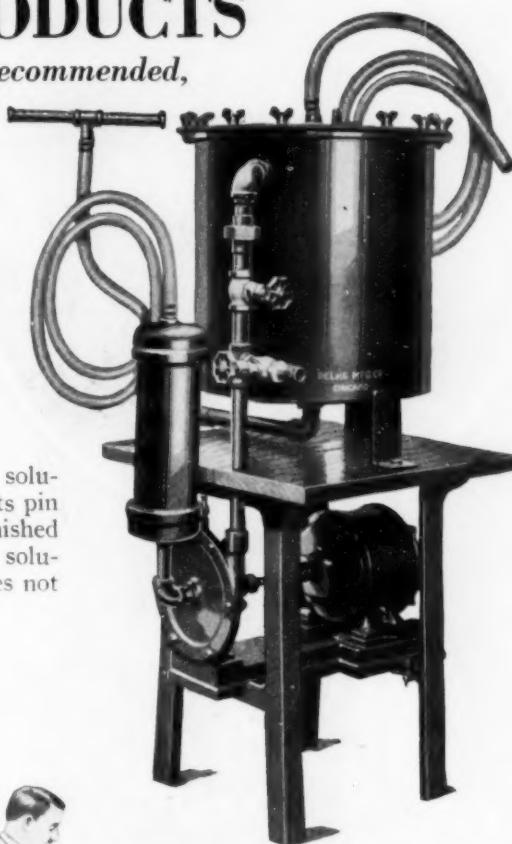


### BELKE HORIZONTAL PLATER

Raised, lowered and rotated from back of tank. No overhead apparatus to interfere with the handling of the work.

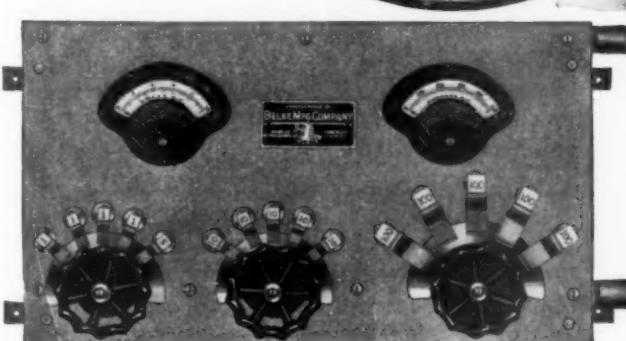
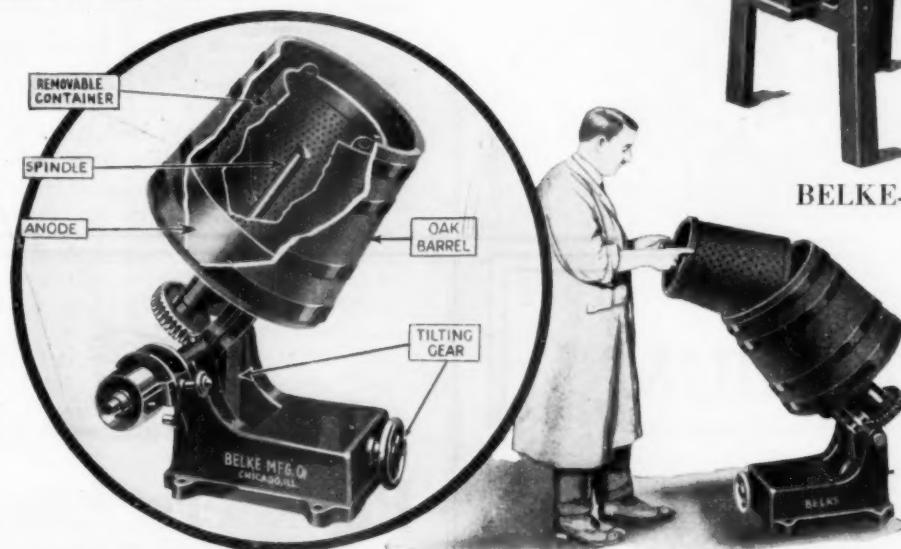
This barrel can also be furnished motor driven. And motor hoist can be furnished, so it can be raised or lowered by switch with no physical labor being necessary.

Belke Filters keep the solutions clean. This prevents pin holes, roughness and blemished deposit. A clear, clean solution plates faster and does not go bad.



### BELKE-STYLE BSMF

A fine small size filter for individual tanks. Larger outfit for all purposes and to meet all conditions carried in stock.



### BELKE RHEOSTATS

Belke Rheostats are the most sensitive, giving individual single ampere steps, with but a few controls. For example, to get 462 amperes turn right hand wheel to 400, center wheel to 50 and 10, and left hand blade to take in two of the 1 amp. switches.

### BELKE SELF-CONTAINED BARREL

The work is contained in an all celluloid unbreakable work container which is readily and easily removed from the barrel on completion, leaving the solution in the barrel.

A large circular anode is permanently fixed inside the bottom of the barrel where it is in the best position in relation to the work to be plated.

*Send for our new catalog*

**BELKE MFG. COMPANY**  
2952 W. Van Buren Street, Chicago, Ill.



## Patent Litigation Decided

We were recently given a broad decision in our Dust Collector litigation against infringers, by the United States District Court for the eastern district of New York.



Factories: Saginaw, Mich.; Boston, Mass.  
Offices: Chicago, Ill.; New York, N. Y.

## CHROMIUM

Electro-plating machinery and especially machines and processes for the deposition of Chromium must be judged by *Performance*. Our machines and apparatus and processes are in successful use in many parts of the United States. Research work and extensive experimentation for years have been carried on by us and our experience and accumulated knowledge are available to the industry.

*Correspondence is invited from interested parties*

**The Chromium Machine  
Company, Inc.**

Sag Harbor, Long Island, N. Y.



## Polishers Attention

You need good Emery.

This is especially true in preparing surfaces for Chromium plating, or any other surface in which it is desired to have no scratches.

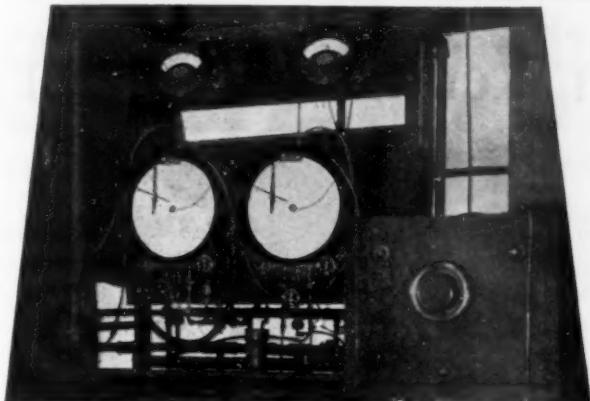
Improved Keystone Emery is always good.

Let's get together for better ways of polishing. A competent Research Department is at your immediate command.

You are invited to submit your problems and share in this free service.

May we serve you?

**KEYSTONE EMERY MILLS**  
4318 Orchard St. Philadelphia, Pa.



## Get that bright, hard finish every time

Chromium Plating is at its best when the temperature of the bath is kept at a certain degree of heat. Manual control can't keep it there. But a Foxboro Chromium Plating Recorder-Controller (Duplex type) can.

Set the Controller at the temperature that gives you the best results. Then forget it. We guarantee every Foxboro Controller to operate on a temperature change of less than one quarter of one degree Fahrenheit. Bath temperatures can't possibly get out of the critical zone.

You have admired the bright, glistening metal fixtures on the Packard, Buick, Graham-Paige and Chandler automobiles. Foxboro Duplex Recorder-Controllers are in charge of their plating baths. Over 100 other successful installations prove that you too can get better results under Foxboro Control.

Write to the nearest Foxboro Branch Office. One of our engineers will be glad to give you full information.



Foxboro Guarantee sealed to each Controlling and Recording Instrument.

**THE FOXBORO COMPANY**  
Neponset Ave. Foxboro, Mass.

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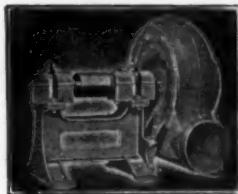
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**THE COMPASS OF INDUSTRY**

Instruments for Controlling, Recording and Indicating Temperature, Flow, Humidity and Pressure.

## CLEVELAND Blow Pipe EFFICIENCY

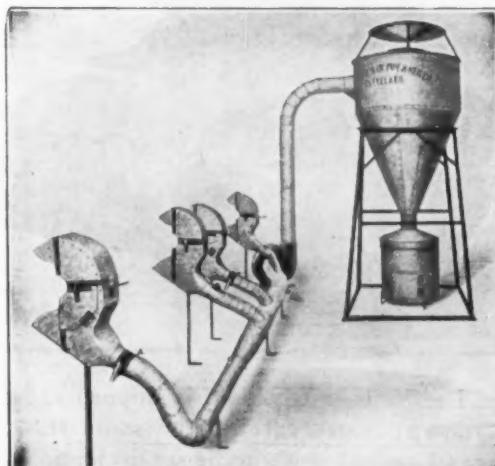
Write us for prices and information on fume removal system for chromium tanks.



EXHAUST FAN

For thirty years we have designed exhaust systems for the removal of dust

From  
Polishing and Buffing Wheels  
Grinding Equipment  
Tumbling Mills



**THE CLEVELAND BLOW PIPE & MFG. COMPANY**  
**CLEVELAND, OHIO**

# The Newcomb Syphon Ventilated Cabinet

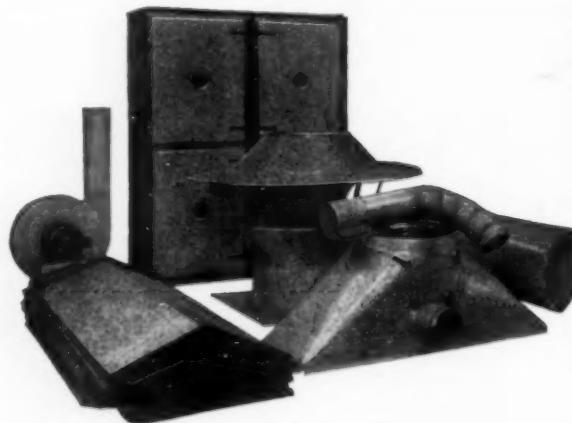
## EVERY METAL MANUFACTURER

should become acquainted with the Newcomb Syphon Ventilated Cabinet. It provides economy of operation and makes for efficiency in any size plant, large or small. And it eliminates a

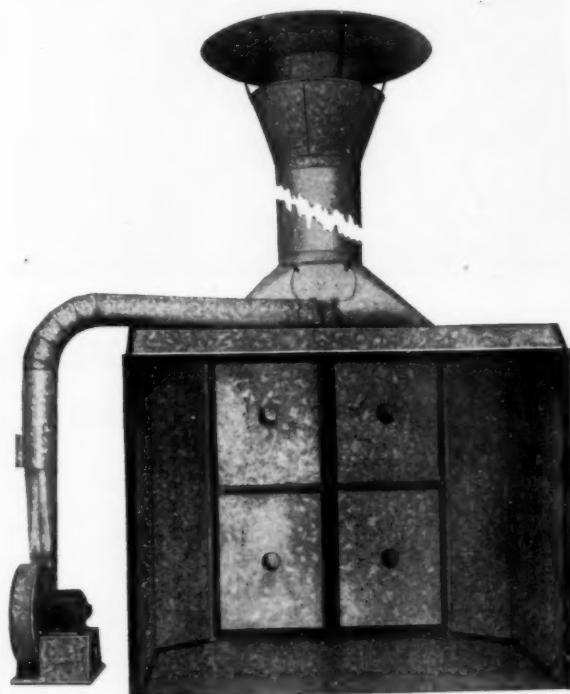
## FIRE HAZARD

as it cannot be set afire through operation. The Newcomb cabinet is a radical improvement over all other cabinets and not only conforms with Underwriters specifications and legal requirements, but **anticipates** regulations which must come as safeguards to the lives and health of employees.

Safe and economical for use wherever spraying or air-brushing is done with shellac, stain, paint, enamel, lacquer, varnish or other material.



The Newcomb cabinet is shipped knocked-down; crated carefully to stand shipment and arrives ready to be set up immediately by any handy man about your plant.



Interior of Newcomb Syphon Ventilated Cabinet

There is a Newcomb cabinet for **YOUR** particular requirements. You do not need to get along with makeshift cabinets that are expensive and dangerous to operate. The Newcomb cabinet has no delicate parts to get out of order and there is no lost time in cleaning—and it eliminates your cabinet fire menace.

Forty years of successful experience as builders of ventilating systems and spray cabinets has given our engineering department a fund of experience which is yours for the asking.

Don't try to get along without an efficient cabinet, for that means expense and danger. Get on the Newcomb basis and be safe and satisfied.

**The Grand Rapids Blow Pipe and Dust Arrester Co.**  
GRAND RAPIDS, MICHIGAN

For forty years, successful builders of Dust Collecting and Ventilating Systems and Spray Cabinets

## One Portable Filter Machine Takes Care of Entire Plant

Filters Nickel, Chromium, Cadmium, Cyanide, Brass, Copper, Zinc, Silver

This machine will earn \$50 to \$100 a day on general tank cleaning jobs

Larger Plants Often Save the Cost of Our Machine on One General Tank Cleaning Job

Keep solutions clean and make possible smoother and brighter plating. Also plate faster account of less resistance and better throwing power of clear solutions. Better plating reduces buffing and polishing costs.

### Note the Low Prices on Complete Portable Machines

3/4 H.P. Capacity thru filter	400 gallons per hour	\$235
1 ditto	800 ditto	270
1 1/2 "	1000 "	280
2 "	1400 "	330
Complete extra filter sets on cover for 1 1/2, 1 and 3/4 H.P. Machines	.....	40
Complete extra filter sets on cover for 2 H.P. larger machine	.....	50

### PRICES HIGHER ON EQUIPMENT FOR ACID COPPER

F.O.B. Chicago—Terms 2 10 Net 30 on approved credit

Capacities stated have been checked on nickel solutions at 10 Baume. When pumping on free hose from tank to tank, capacity is three times greater than thru the filter.

Quotations cover on machines equipped with 3 phase, 60 cycle motors and on 3/4 and 1 H. P. machines with single phase 60 cycle motors. Standard list extras on other motors.

If you have your own motor to use on outfit price will be less



### FILTER SET

Sludge Forms on Outside  
Washes Off Easily



Extra Filter Sets Are for  
Different Solutions Where  
Frequent Changes Are to Be  
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Filter Is Necessary

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Inc.  
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Est.



1899

Now that 1927 figures are in, are you satisfied with the profits and efficiency of your plating room?

Do you want to step it way up in 1928?

We enabled several concerns to do the trick last year. We can do the same for you this year.

ASK US HOW.

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*Manufacturers of Galvanizing Equipment and Electro-Plating Machinery*

1243-49 FULTON STREET

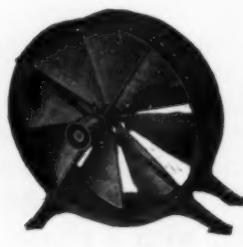
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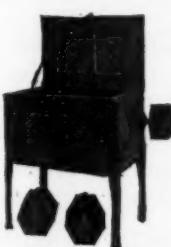
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Polishing Benches



Ventilators



Tubbing Machines



Drying Systems



Sand Blasts

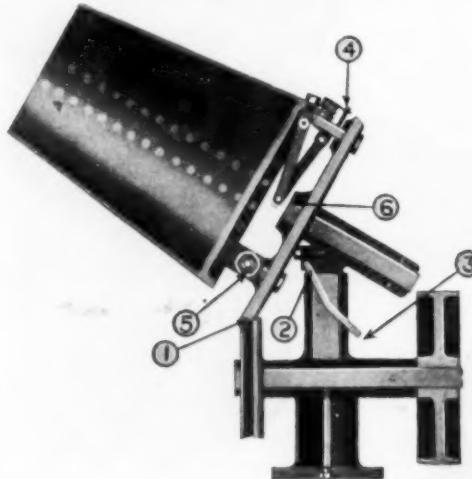
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Satin Finishing, quicker, safer, more uniform than scratch brushing or acid dips—No streaks or blotches. Used on metals, glass, rubber, fiber, bakelite and all compositions.

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a vacuum or pressure, for fuel oil and gas burning,  
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ANODES  
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(Cast, Rolled and  
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Extensive experience in the manufacture,  
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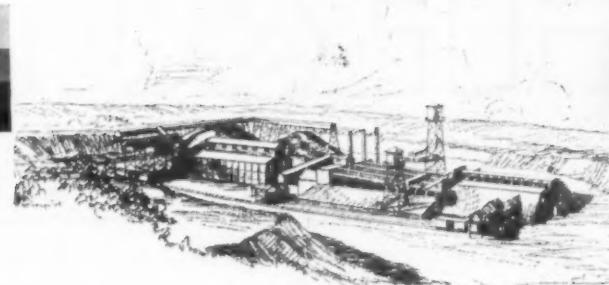
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EVERY single step in the production of Alundum abrasive is under Norton control.

From Norton Bauxite mines in Arkansas comes the raw material. In Norton electric furnace plants at Niagara Falls and Chippawa bauxite is fused and crystallized at a temperature of 3700° F. into hard, tough Alundum abrasive.

In the Norton manufacturing plant at Worcester Alundum abrasive is crushed, screened and treated. And as the final step it is packed in the special Norton keg which prevents contamination and protects capillarity.

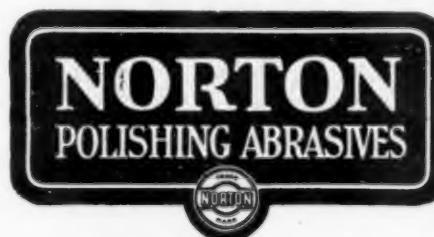
Thus the user of Alundum abrasive for polishing has a product whose quality is *certain*. Every step of its production has taken place

within one organization—the world's largest manufacturer of abrasive products—with the most modern equipment and the skill of forty years' experience.

### NORTON COMPANY, WORCESTER, MASS.

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## When Production Reaches the Plating Room

PRESENT-day production plating demands equipment, both electrical and mechanical, which will operate at capacity day in and day out without interruption; reliable machines, with adequate overload capacity which will function under such conditions over the years with minimum care.

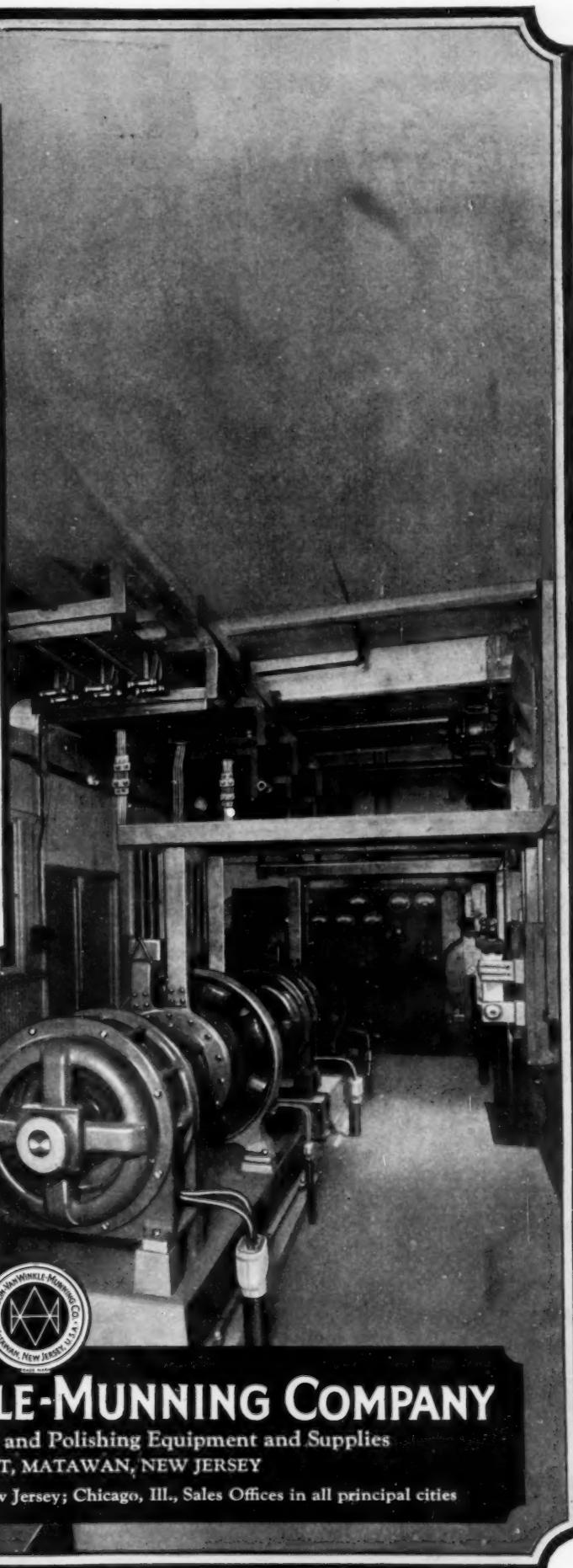
And no-where is this reliability more essential than in the plating generator.

### Hanson-Munning Generators

have demonstrated their ability to meet the demands of modern production. Their design characteristics are based on 50 years' experience and are no longer theoretical. Built to carry their rated capacity continuously, they also give the maximum possible over-all plating efficiencies at all loads. Built with commutator and brushes that will stand up under heavy amperages, they nevertheless permit inspection and adjustment of brushes while the machine is running.

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Manufacturers of Electroplating and Polishing Equipment and Supplies

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Factories: Matawan, New Jersey; Newark, New Jersey; Chicago, Ill., Sales Offices in all principal cities



*Imperial Patented  
Multiple*

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Multiple*



### COMPARTMENT MACHINES

are made to withstand production strains. These machines positively cut polishing costs.

These machines are made in sizes from two to six compartments. Unequalled for the manufacturer who wishes to polish a number of different kinds of small parts at one time and keep each kind separate.

We make seven stock sizes of this machine and can build them in special sizes if wanted.

We also build several sizes of single compartment machines and carry a complete stock of steel balls, cones, spickets and soap powder for burnishing purposes.

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Duriron pumps, piping, valves, tank outlets and exhaust fans are proof against corrosion, and do not contaminate electrolytes.

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All sizes, shapes, capacities. Solid ACE Hard Rubber or ACE Hard Rubber tank lining.



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A complete line of threaded ACE Hard Rubber Pipe from  $\frac{1}{4}$  to 4" diameter. Larger sizes to order.



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Centrifugal, reciprocating, gear, single and double acting. Hand, Belt, Steam and Electric Drive. Capacities 6 to 200 gallons per minute.



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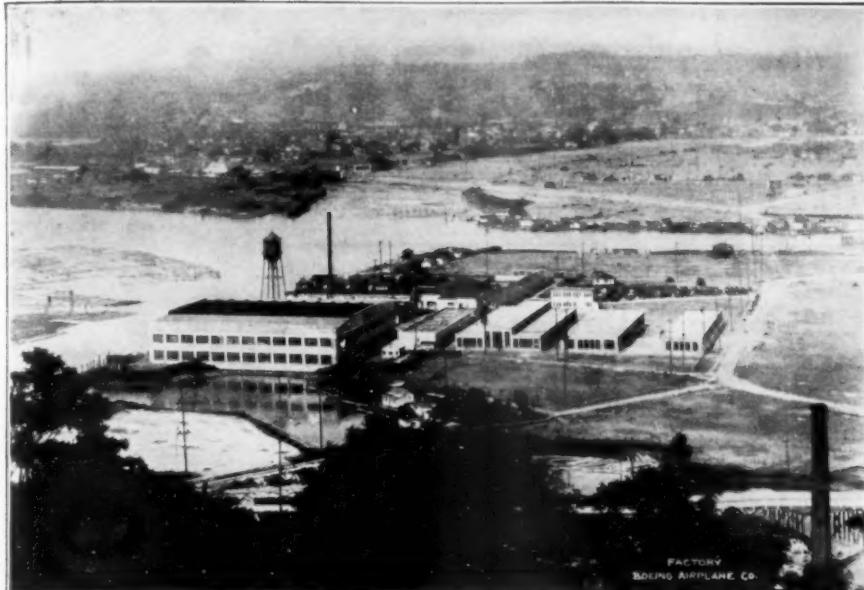
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Udylite Service Plants are established in all the principal cities to serve manufacturers of steel or iron products. Some manufacturers may prefer to apply the Udylite Process in their own plants—full information will be given them, upon request.

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Ask for our new Bulletin No. 204

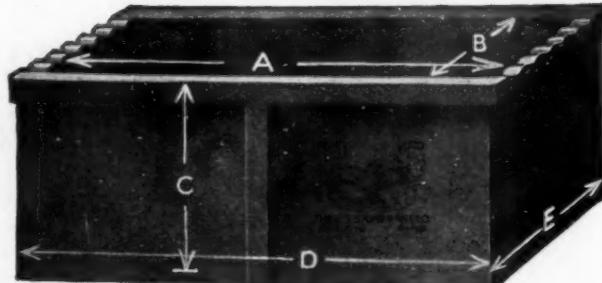


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Gal.	Length	Width	Depth	Weight	Code Word	List Price
4	12"	9"	9"	30	GAMUT	\$10.90
10	16	12	12	60	GARB	16.00
16	20	16	12	83	GEAR	22.50
26	24	16	16	150	GENUS	29.50
38	28	20	16	186	GIPSY	45.00
41	24	20	20	197	GLADE	46.00
44	32	20	16	265	GLAND	55.00
66	32	24	20	330	GLOSS	68.00
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104	36	28	24	438	GRANT	100.00
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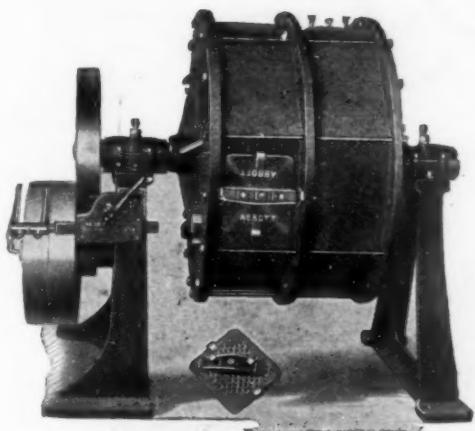
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It's logical because the Abbott Process of finishing is the most economical under the sun.

Adaptable to about 90% of all small parts, the Abbott machine ordinarily cuts hand buffing costs from 75% to 80%.

The possibility of being able to register such tremendous savings is well worth checking up.

Put your finishing problem up to our engineers, sending samples for analysis. No obligation.

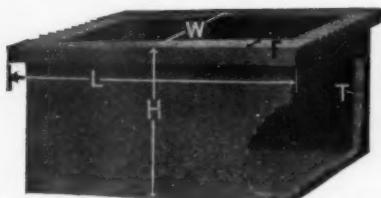
**The Abbott Ball Company**

"Originators of Commercial Ball Burnishing"

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MADE IN ONE PIECE  
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CLEAN AS A CHINA DISH

MADE OF ACID-PROOF CHEMICAL STONEWARE, THE MATERIAL  
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POTS  
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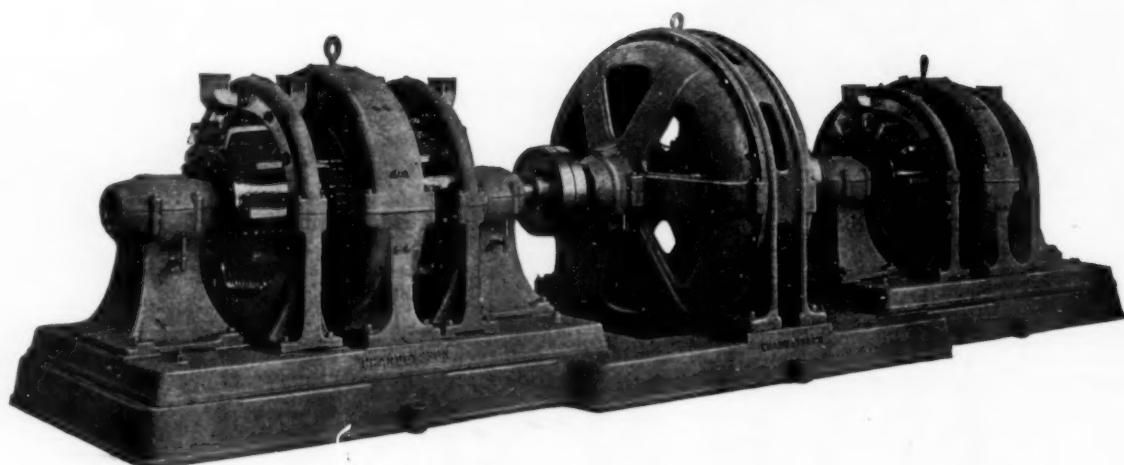
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MODEL 1922

400 R.P.M.

15,000 AMPERE SET

CONSISTING OF

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7500 AMPERES EACH

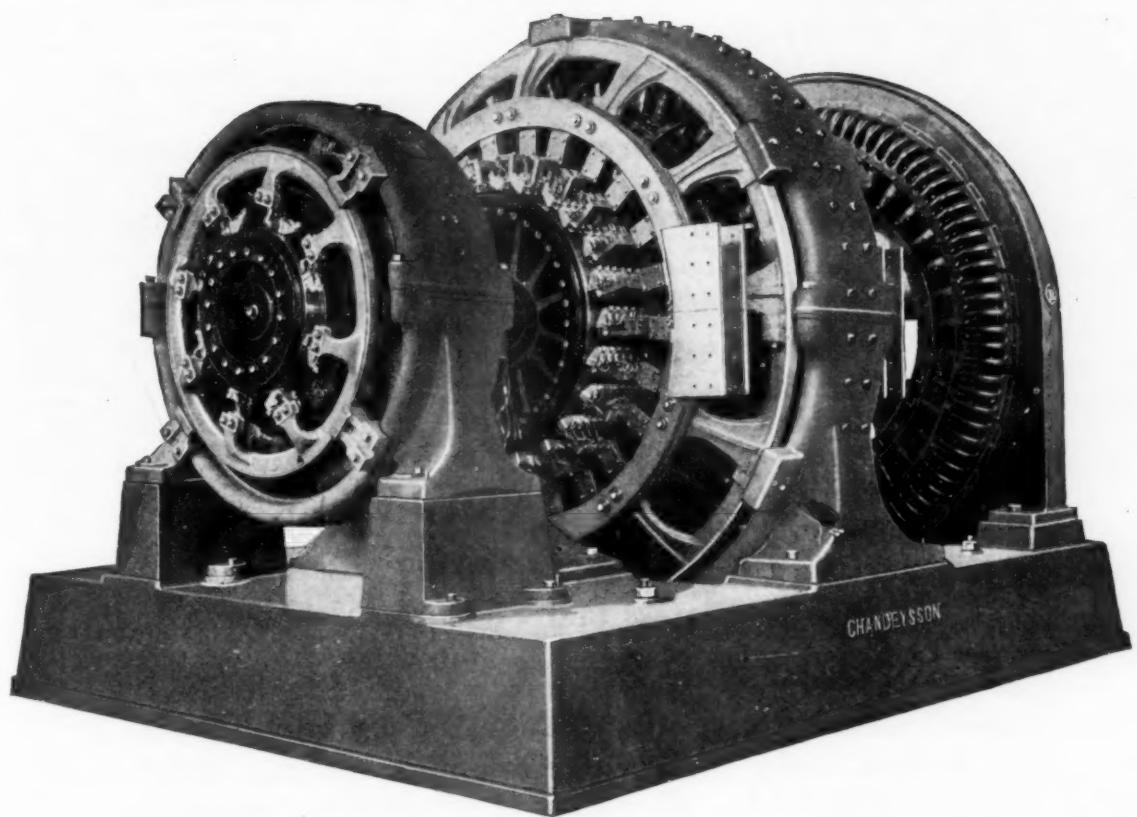
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SEPARATE EXCITER LOCATED ELSEWHERE

CHANDEYSSON ELECTRIC CO., ST. LOUIS

# DESIGN



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MODEL 1928

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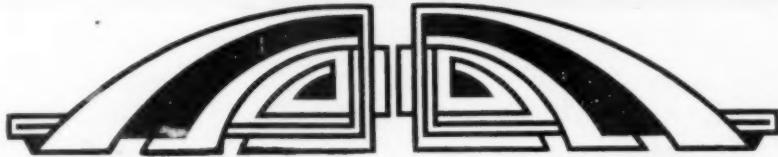
15,000 AMPERE GENERATOR

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GENERAL ELECTRIC SYNCHRONOUS MOTOR

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FOR

CHROMIUM, NICKEL, COPPER, BRASS, ALUMINUM

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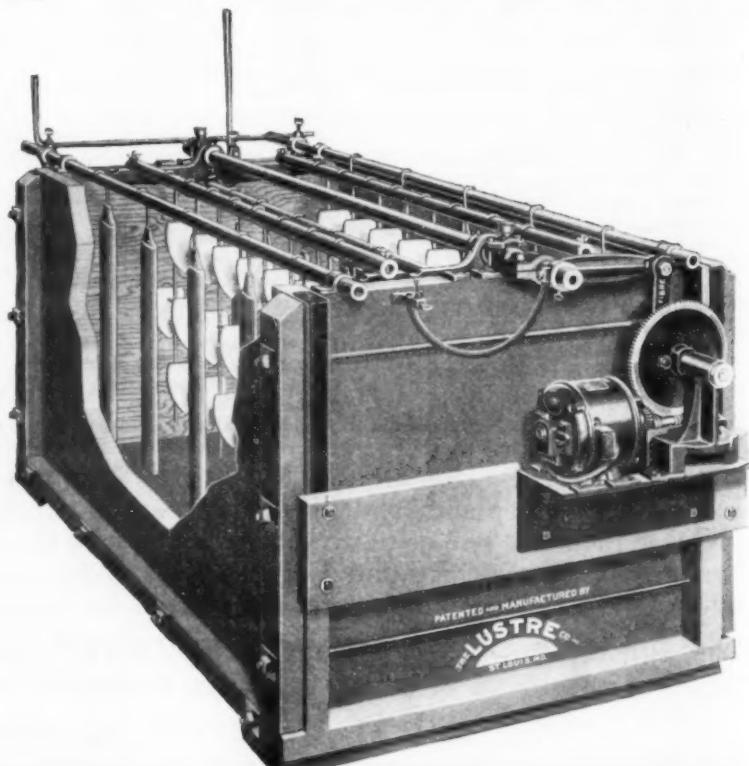
## THE LUSTRE CO. INC., ST. LOUIS, MO.

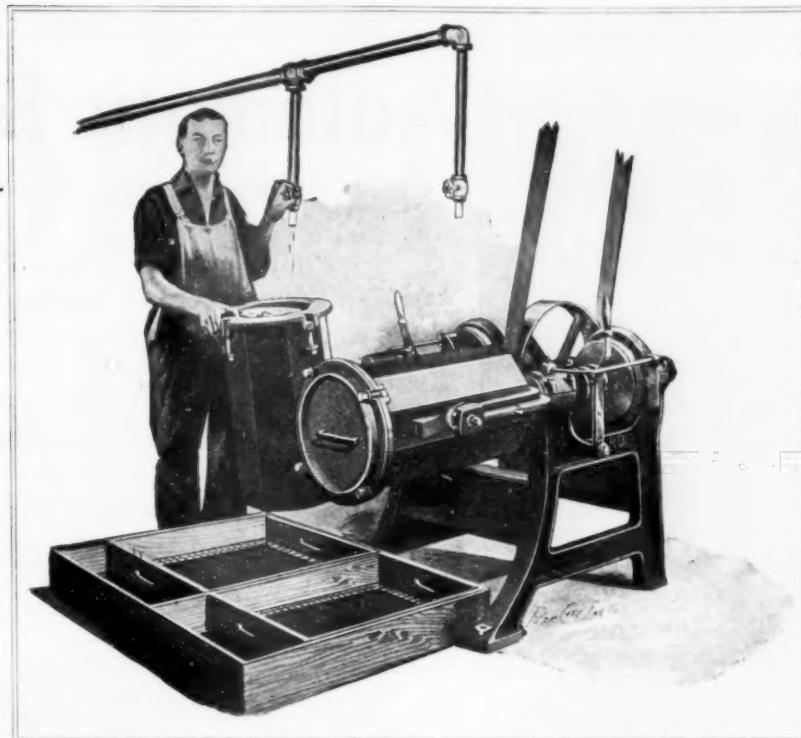
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Plater Will  
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Plates 3 to 4 Times  
Faster.

Attaches To Your  
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*Write for Our  
Bulletin No. 202 for  
Price and Full Description.*





This is the  
**BAIRD**  
**Double Burnishing Machine**

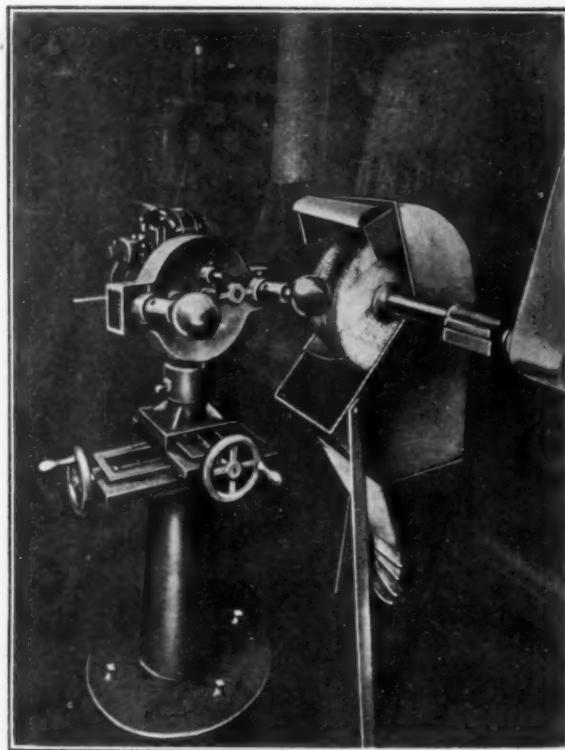
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all purposes—on small  
metal goods.



BAIRD makes auto-  
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**THE BAIRD MACHINE COMPANY**  
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New England Sales-Service-Supplies Representatives for The Udylite Process Corporation of Detroit, Mich.

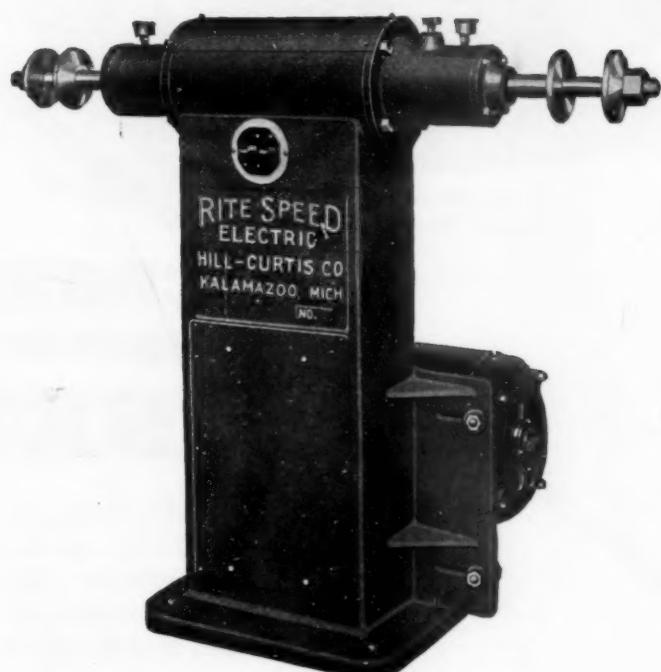
Branch Plant  
**NEW HAVEN SHERARDIZING CO.**  
1033 South High St.,  
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Foreign Representatives  
**OLIVER BROS., INC.**  
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# MORE PROOF!

## HILL-CURTIS

POLISHING LATHE SATISFACTION IS AGAIN  
PROVED BY THE REPEAT ORDERS



"Rite Speed" Electric Lathe



AMERICAN FORGING  
& SOCKET CO.

Pontiac, Michigan

BUYS **20** MORE

"RITE SPEED" LATHES



Early 1928 Installed 1 Lathe

Late 1928 Installed 20 More

*Ask for Our Polishing Lathe Catalog*

**HILL-CURTIS CO.**  
MAKERS OF  
POLISHING AND GRINDING MACHINERY  
**KALAMAZOO MICHIGAN**

1600 Douglas Ave.

HANSON-VAN WINKLE-MUNNING CO., Distributors, U. S. A.

# CROWN

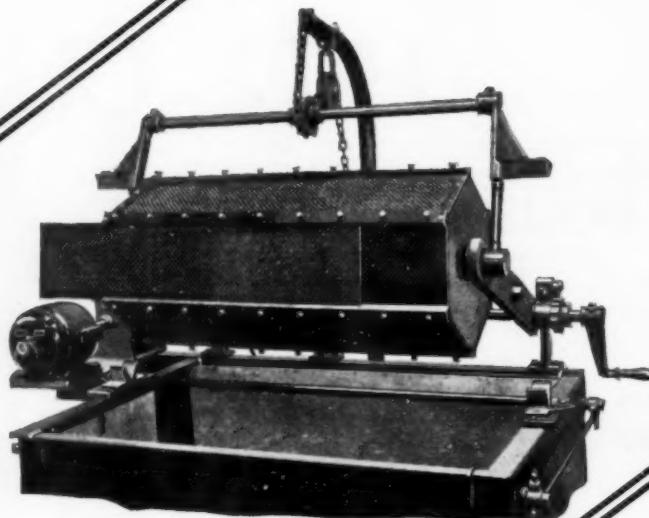
*for Burnishing*

*—Plating*

Designed and built  
by men with both  
practical and  
engineering  
experience



Crown Junior  
Plating Barrel



Crown Maximus  
Plating Machine

**CROWN**  
**EQUIPMENT**  
**SER**

Users of "Crown" plating equipment are constantly sending in repeat orders which indicates that the design is right, maintenance cost low, and service uninterrupted.

There is a reason for this! Our machines are designed by men who are engineers and have had plating shop experience, a combination that is unusual and has real merit.

We have illustrated here, four plating, burnishing and tumbling barrels that we are building in our own plant, and feel proud to

We also build Crown  
Rheostats, Plating Ma-  
chines

and  
Crown Lathes both  
Belted and Electric  
Drive for Polishing and  
Buffing.

**CROWN RHEOSTAT**

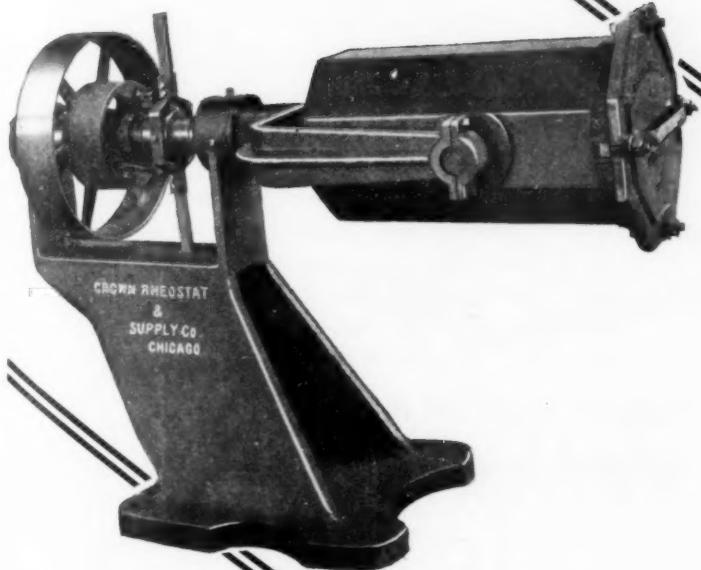
1912 Maypole Ave.,

**IF IT'S FOR PLATING, BUFFING**

# BARRELS

## *and Tumbling*

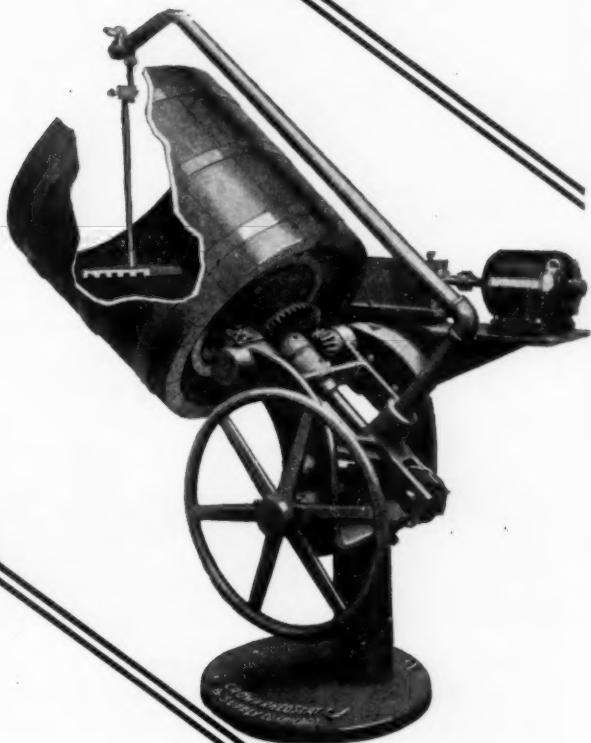
All gears, bearings  
etc. are oversize  
to assure con-  
stant service  
at low cost



**MADE  
STANDS FOR  
VICE**

ship them out under the "Crown" name.

This is the result of having studied carefully other equipment of this type, finding the weak and objectionable points then building what we have found to be machines that are giving good service at a low operating cost. We enjoy working out your problems, write to us and we will delegate one of our men to help you. We will gladly mail special bulletins on any of the machines shown here or anything else you may be interested in.



Crown Oblique  
Plating and  
Tumbling  
Barrel

A new book illustrating  
and describing "Crown"  
Electric Spiral Gear  
Driven Lathes is just  
off the press—if you  
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away.

**& SUPPLY CO.  
CHICAGO, ILL.**

**OR POLISHING WE SELL IT — —**

# You Should Know...

Our new process of producing buffing compositions enables us to put out compositions that work cleaner, last longer and give you a higher finish than the ordinary composition, and, actually cost less.

- No. 375 Tripoli Composition, for cutting down before Chrome Plating.
- No. 575 Brass or Copper Coloring Composition, before Nickel Plating.
- No. 775 Lime Finish for Coloring Nickel before Chrome Plating.

The three standard, fully saponifiable,

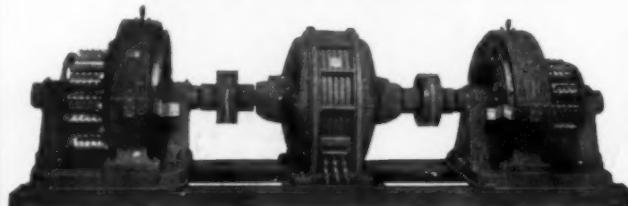
### *Polishing and Buffing Compositions for All Purposes.*

## KRIGNER TRIPOLI CO.

425 S. Campbell Ave.

DETROIT, MICH.

### J & L GENERATORS



J. & L. Direct Current, Motor Generator for Electrolytic Work, Electroplating, and General Deposition of Metals. Built in Sizes from 200 to 10,000 Amperes.

#### *Maintaining*

CONSTANT VOLTAGE with all changes of load in amperes. VOLTAGE is adjustable from 2 to 8 volts; in the larger sizes from 2 to 12 volts. At whatever point the voltage is set for, to the full range of the generator, this voltage will remain constant for all changes of load in amperes to the full capacity of the generator.

#### *OUR SERVICE DIVISION*

is at your service and prepared at all times to give you assistance with your plating problems, with technical and practical experience to scientifically determine your requirements.

**THE JANTZ & LEIST ELECTRIC CO.**  
Western Avenue and York St. Cincinnati, Ohio

## FELT

### NO SOFT SPOTS

One reason why American Felt Company's polishing felts have gained such favor is their uniformity. There are no soft spots. You get uniformly polished surfaces because of the uniformity of the felting.

That's why an increasing number of polishing rooms are using American Felt Company's polishing felts exclusively.

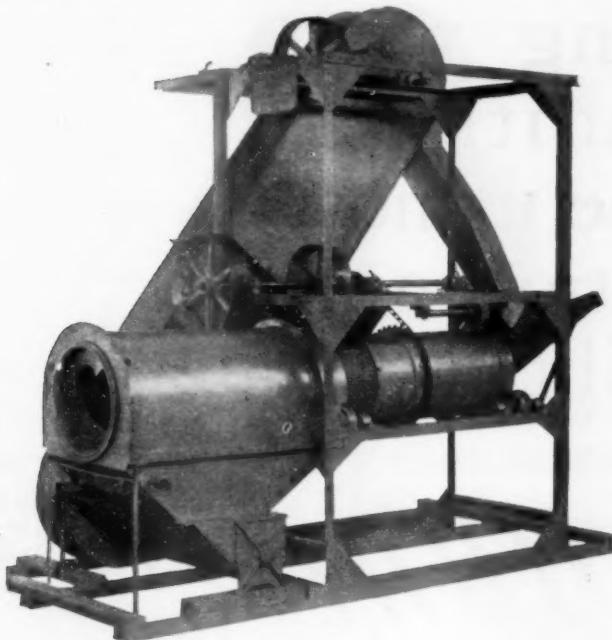
## American Felt Company



213 Congress St.  
BOSTON

114 E. 13th St.  
NEW YORK

325 So. Market St.  
CHICAGO



## How IDEAL Helps Faultless Caster Clean and Dry Light Stampings



### Engineering Service

Problems of removing scale, chips and fins from castings and forgings—of scrubbing, rinsing and drying stamped and drawn parts, removing grease, oil and chemicals—are special problems. Ideal Engineering Service involves a study of your particular problem and the application of automatic equipment to solve it, *at a considerable saving in labor*. Our engineers will gladly examine your situation—asking them to do so will incur no obligation.

In Evansville, Ind., the Faultless Caster Co. had the problem of cleaning and drying light metal stampings.

Here it was necessary to clean and dry small metal parts between operations in the plating department. An Ideal sawdust drier, installed some years ago, has handled the work very satisfactorily, in less time and with less labor than the equipment it displaced.

The work is introduced into the barrel at one end and is carried through the drum by a spiral worm welded to the shell. Hot dry sawdust dries and polishes the work and is separated from it in the final screen section. The work discharges into truck receptacles and the sawdust is elevated by a heated con-

veyor and returns, thoroughly dry, to the charging end. Thus a continuous stream of sawdust passes through the machine.

The sawdust drying machine shown here, similar to the Faultless installation, is a standard model. Just as it stands it may solve the cleaning and drying problem in your plant. Maybe an entirely different equipment will do the work more thoroughly, in less time, at lower cost. We have many different models—many standard units that may be assembled in various combinations. Before Ideal engineers recommend any machine for your use they will insist upon understanding your problem. Giving them that opportunity places you under no obligation.

**IDEAL**  
INDUSTRIAL MACHINERY

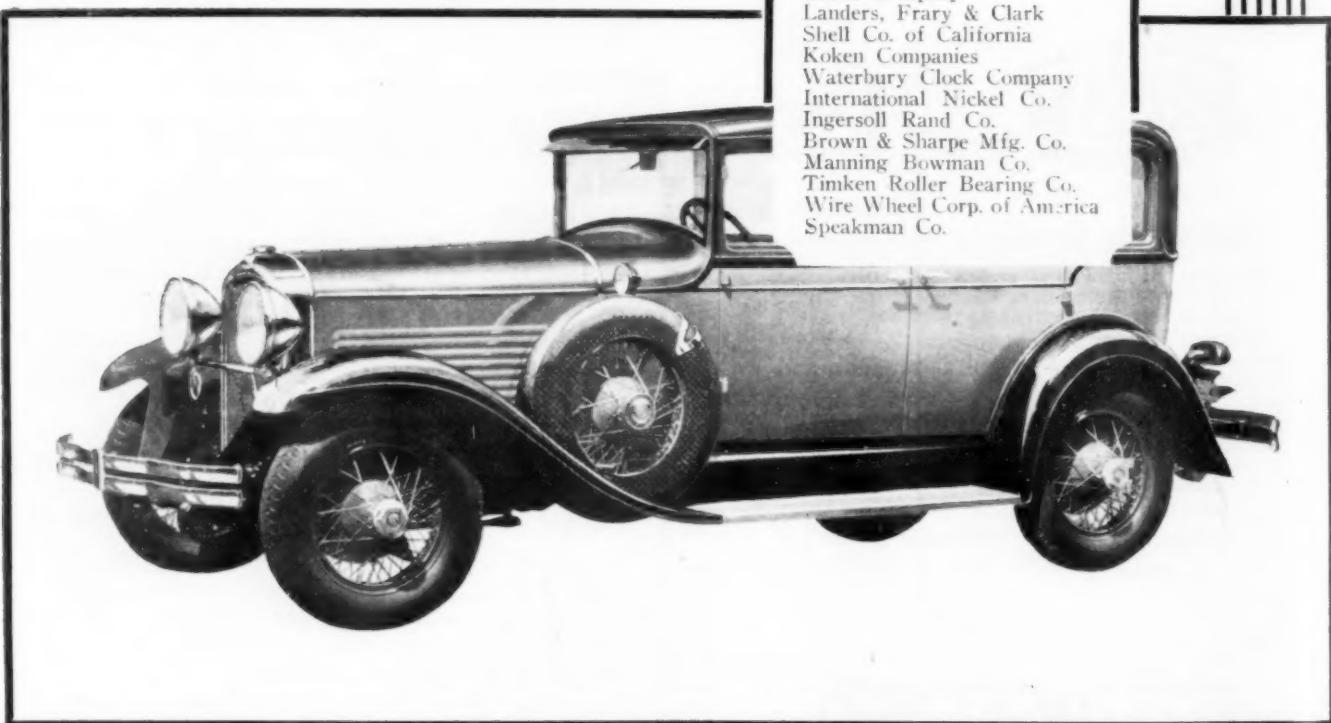
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Division of Consolidated C. M. Corporation

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In keeping with  
their traditional  
aim for the utmost  
in distinction and  
dependability . . .

*Marmon*  
chromium plates  
by the UNITED  
CHROMIUM process



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licensed under the  
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Yale & Towne Mfg. Co.  
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Crane Company  
Landers, Frary & Clark  
Shell Co. of California  
Koken Companies  
Waterbury Clock Company  
International Nickel Co.  
Ingersoll Rand Co.  
Brown & Sharpe Mfg. Co.  
Manning Bowman Co.  
Timken Roller Bearing Co.  
Wire Wheel Corp. of America  
Speakman Co.

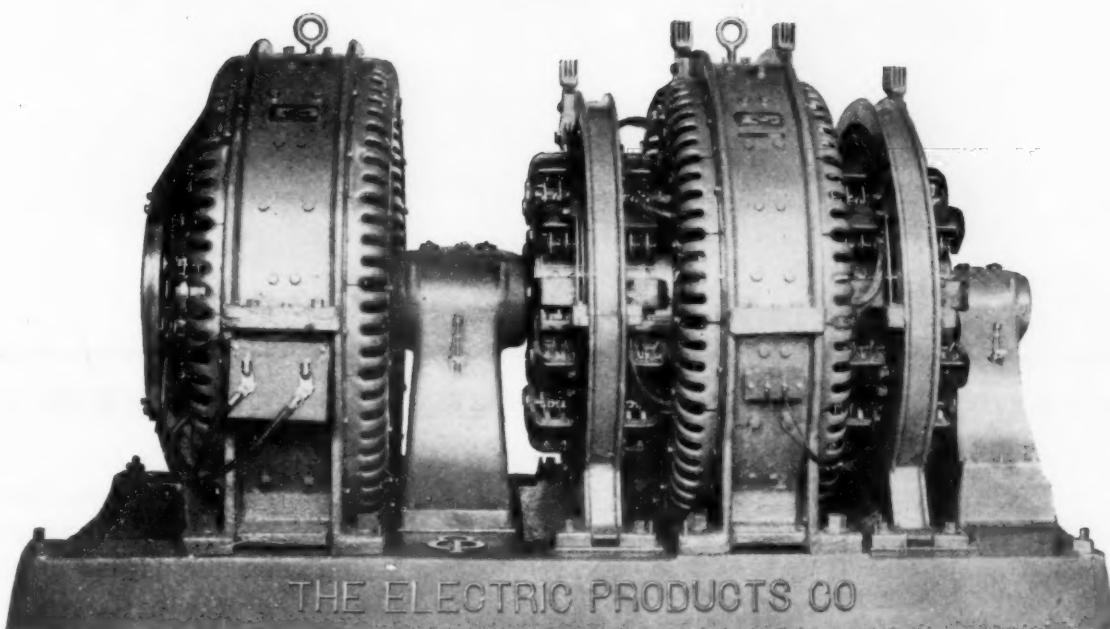
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INCORPORATED

51 East 42nd St., New York City

MOTOR  
GENERATOR



PLATING SETS



THE ELECTRIC PRODUCTS CO

CHROMIUM PLATING, with its rapidly broadening field of applications, is one of the outstanding industrial developments of this time, not only in the finishing of parts where appearance is the prime consideration but for utilitarian service and economy as well.

E-P Electroplating Motor-Generators are keeping pace with the increasing demands of this service, with equipment of modern design, high efficiency, and covering a range of capacities from laboratory sets to units of the type shown above.

Manufacturers of low voltage generators for fifteen years.

( Bulletin 90  
fully describes  
this equipment.  
Write for copy. )

Manufactured by



**The Electric Products Co.**

CLEVELAND, OHIO

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New York Office

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# *furnishing promptly material where others failed—*

was embodied in an order received from Arizona. Yet this was just part of the daily work, and the kind of Service which doesn't fall down.

You may also have "problems." Why not use Boissier's Experience and Willingness? Old and new customers find this very much worth while. That's why new customers soon become old ones.



**BOISSIER ELECTRIC CORP.,**

100 Walker Street  
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*Electroplating, Electrotyping and Polishing  
Equipment and Supplies*



HE initial cost of cleaner is but fractional and readily forgotten when the desired results are obtained—especially if maintenance costs are at a minimum.

The colloidal properties of METEX give the utmost in cleaning strength, doing the operation thoroughly and quickly and lasting a much greater length of time than other cleaners.

Why not practice true economy by employing only—

**Metex  
Metal Cleaner**

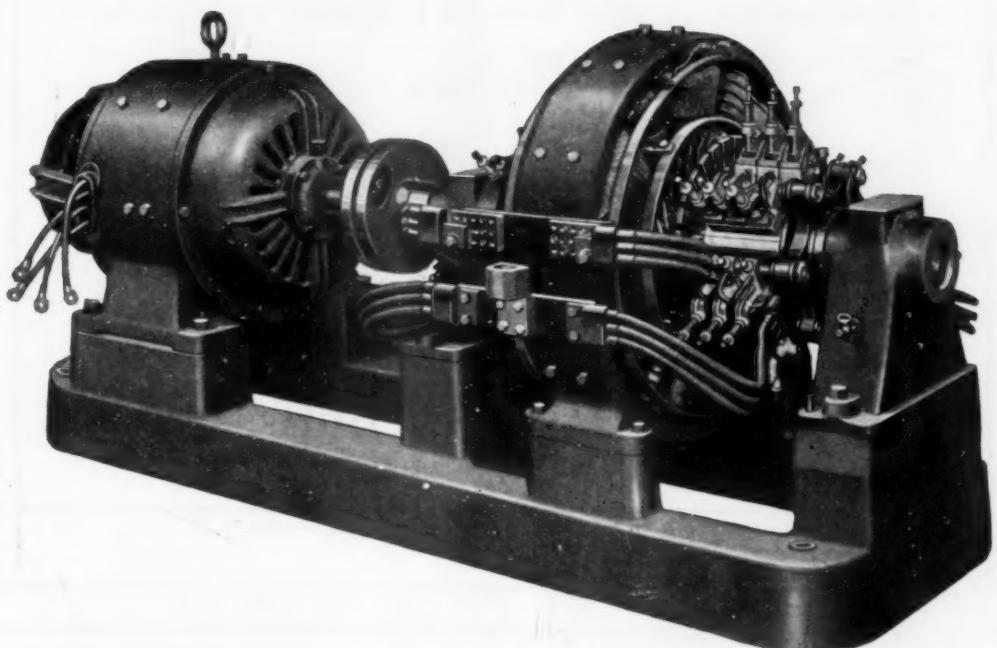
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MANUFACTURERS

Waterbury

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## *Improved American Giant Plating Generators*



THESE generators have withstood the test of severe service for 35 years, proving that they are designed and constructed to give the maximum of service in production work.

They also have the flexibility and favorable operating characteristics of a piece of laboratory equipment.

This makes them particularly well suited for *chromium plating* where the demand for production must be met with the accuracy of the laboratories.



**CONNECTICUT DYNAMO & MOTOR CO.**

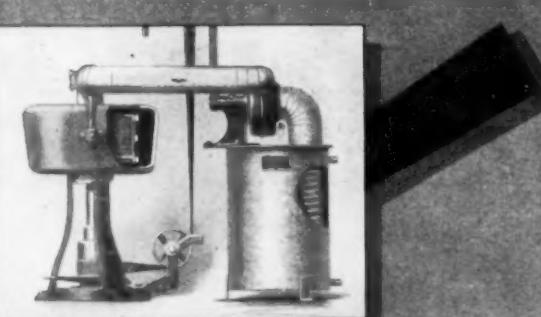
196 Lyons Ave., IRVINGTON, N. J.

*Manufacturers of Improved American Giant Plating Dynamos.  
The Rotoplater—the Simplified Plating Barrel.*

**F. L. & J. C. CODMAN COMPANY**  
**MANUFACTURERS**

15 Elkins St., S. Boston, Mass. Salesroom:  
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We manufacture all standard  
grades of Loose and Sewed Buffs.  
Our specialty "Champion" and  
"Victor" Sewed Buffs.



# **TOLHURST CENTRIFUGAL METAL DRYER**

Dries small metal parts in 2 to 5 minutes without the nuisance of sawdust and at a lower cost!

**TOLHURST MACHINE WORKS, INC., TROY, N. Y.**  
ESTABLISHED 1852  
NEW YORK OFFICE, 102 MADISON AVT.



Specialists in  
**LACQUER**

The Merrimac Chemical Company  
makes **METAL LACQUERS** to  
fit the individual requirements  
of its customers.

## Gloss Enamels Flat Enamels in Black

## Flexible Enamels Crackle Enamels and Colors

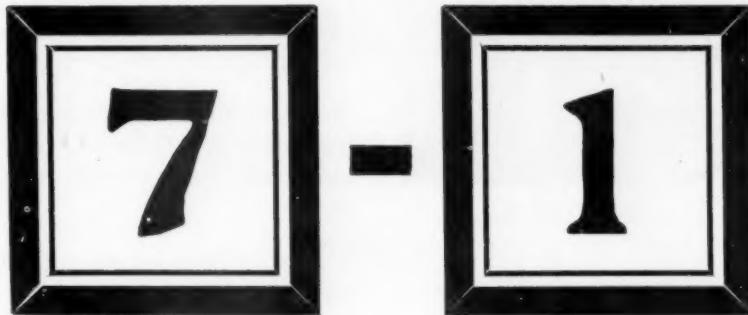
## Brass Lacquers

## Silver Lacquers

## Merrimac Chemical Company

BOSTON  
148 State St.

**NEW YORK**  
7 East 44th St.



NO, these are not the odds on a football game, but the proportion of anode cost of **CADMIUM vs. DUOZINC Plating** [*Worth looking into, is it not?*]

Cadmium is used in many cases for plating of *Steel*, where DUOZINC actually is preferable; for instance, wherever the finish is to be finally painted or enamelled, and also on articles which require maximum corrosion resistance, but the color of which is not of importance.

Considering the present high cost of Cadmium, due to scarcity, we recommend that you investigate our DUOZINC process. Exterior weather tests

have shown that an equal weight of DUOZINC gives actually superior rust protection to Cadmium.

Full details given on application.

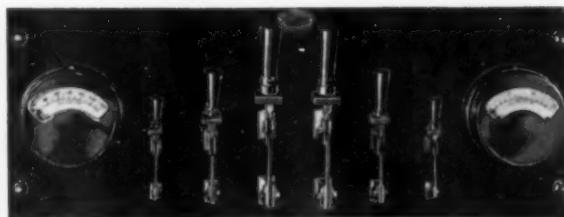
For cast iron we recommend CAD-A-LOY.

\* \* \*

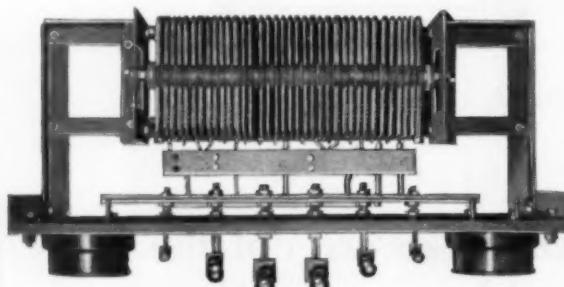
Inquire of us also regarding materials and data for plating of **CHROMIUM TIN** and any other class of finish you are called upon to turn out.

*The*  
**ROESSLER & HASSLACHER CHEMICAL COMPANY**  
709 Sixth Avenue      New York, N. Y.

## Columbia Cast-Grid Tank Rheostats



Front view of the Columbia Cast-Grid Rheostat is unobstructed and safe.



View from top. Grids are firmly placed on angle frame —where they cannot be damaged.

Offers all the advantages of the wire resistance type with none of the disadvantages.

Built throughout to outlast the life of the generators. Absolute control of current and voltage in the solution. Not affected by acids.

Reduces heating to a minimum. Eliminates high resistance joints, breakage and loose connections at point of contact.

Large number of steps of regulation with small ampere divisions.

*Write for Descriptive Bulletin C-100*

**Columbia Electric Mfg. Co.**

1292 East 53rd St., Cleveland

## THE METAL INDUSTRY for 1929

*larger, better and more interesting  
than ever*



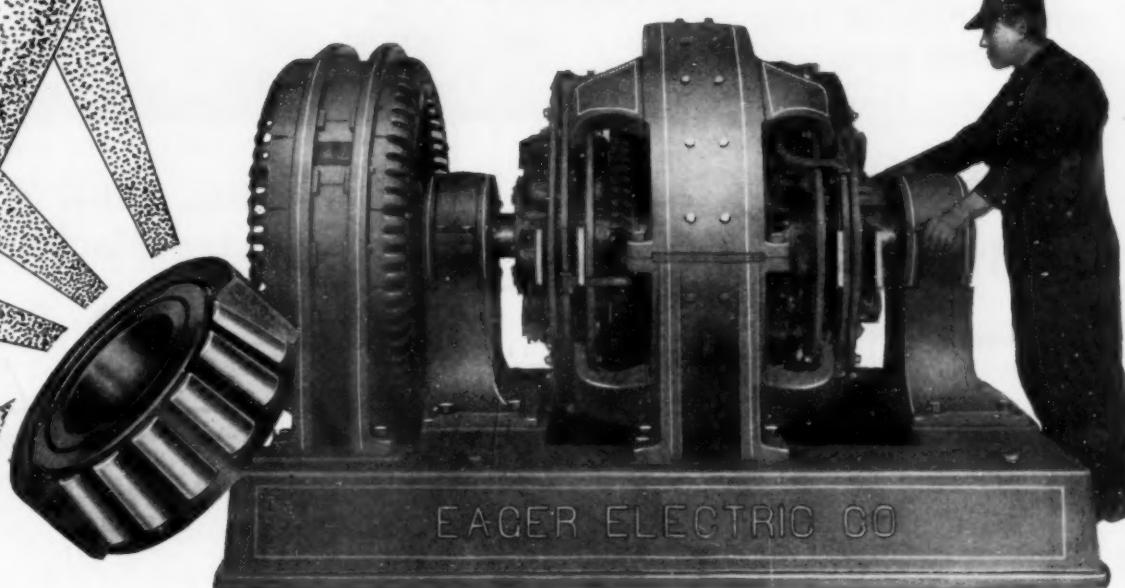
## BOUNDED VOLUMES FOR 1928

will be ready early in January, 1929. Price \$3.00 and with a year's subscription to The Metal Industry the price is \$3.50. Please send your order today to THE METAL INDUSTRY.

Box 183, Wall Street Station, New York

A New

# Chromium Plating MOTOR GENERATOR WITH TIMKEN ROLLER BEARINGS AND SYNCHRONOUS MOTORS



## YOU OUGHT TO INVESTIGATE

You ought to find out why it will deliver laboratory accuracy in actual plant production; why it will carry a full load continuously for 24 hours, indefinitely, without electric or mechanical trouble.

Our engineers will gladly give you all these details—either in person or by mail. They will go further—tell you where these generators are being used—what jobs they are doing in the various plants—and how it will solve some of your Chromium Plating problems. All this service is given absolutely without obligation, that you may know the latest developments in this field.

Write us fully on your letterhead today. Your inquiry will be given prompt attention.

ESTABLISHED 1901

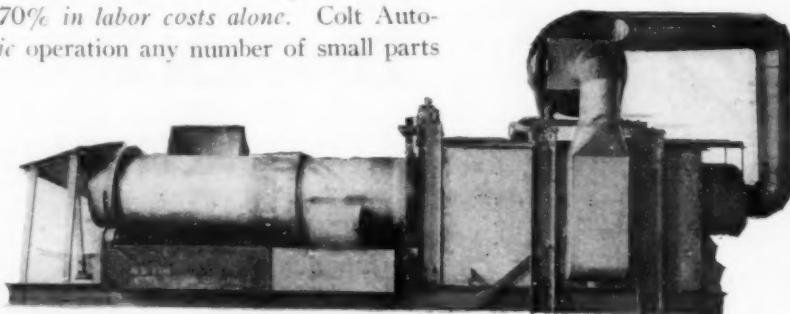


WATERTOWN, N.Y.

## After They Added This Efficient Workman to Their Payroll—

Such giants of industry as Schrader, General Electric, New Departure, American Hardware Corp., Torrington Co., Jones & Laughlin Steel Corp., and many others found they not only had increased the efficiency of their metal parts washing and speeded up production—but to their amazement they found Colt Autosans had actually saved as high as 70% in *labor costs alone*. Colt Autosans wash, rinse and dry in one *automatic* operation any number of small parts without mixing separate jobs.

Model 28 Revolving Type Autosan illustrated. Washes, rinses and dries metal parts in process.



*Write for Detailed Information*

COLT'S PATENT FIRE  
ARMS MFG.  
Hartford, Conn.

# COLT AUTOSAN

*"The Machine That Washes Metal Parts Clean"*

Washing, Rinsing and  
Drying Machines



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## Tribasic Calcium Phosphate

TECHNICAL—PURE—USP

**WILCKES-MARTIN-WILCKES CO.**  
135 William Street, New York City

COMPOSITIONS

MANUFACTURERS OF



*"There's a Reason"—*

Over 75,000 Cans

**HI-PO-LIME**

*"The High Polishing Lime"*

Used Between Jan. 1 and

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Made and sold exclusively by

*E. Reed Burne*

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**"JIM DANDY" BUFFS** save you  
money

Buy Your Loose and Sewed Buffs direct from Manufacturers

**THE ODEN CORPORATION**

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COMPOSITIONS BUFFS PLATERS' SUPPLIES

**THEWS-HARBISON-THEWS, INC.**

Consulting Chemists and Metallurgists

Specialists in the treatment of NON-FERROUS RESIDUES, wastes, scraps, and ores by metallurgical and hydro-metallurgical methods. Design and construction of all metallurgical furnaces and implements.

METAL LACQUERS

Broad, Wallace & 15th Streets

Philadelphia, Pa.

For  
**BALL BURNISHING**  
 before and after plating  
 use  
**MAGNUS  
 BURNISHING SOAP**

It will give you better results at lower cost than

Cyanide	Platers' Cleaner
Soap Bark	Chip Soap
Molasses	Soft Soap

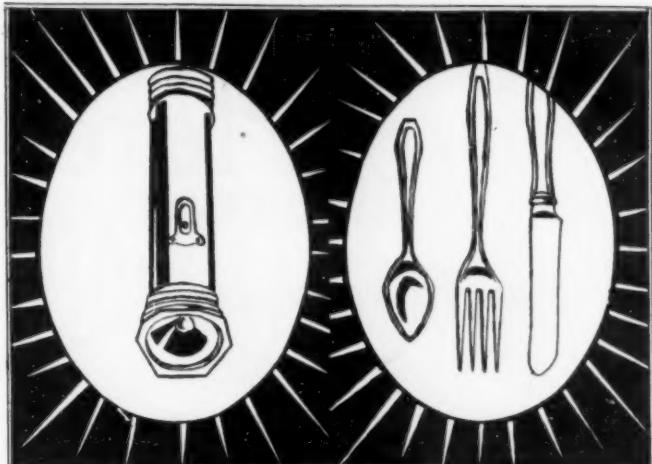
Magnus Burnishing Soap gives a higher lustre and a brighter color to the metal and makes an excellent foundation for plating. The small quantity necessary is surprising. In most cases 1 ounce to 5 gallons of water is sufficient.

*Write for sample and directions*



**Magnus Chemical Company**  
 Manufacturers of Cleaning Materials

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(THE FINISH BEAUTIFUL)

Imitated but never equaled:

**“ZIP” CROCUS**

The brown wonder for coloring Chromium Plate.

Does not show up in the corners of the work.

**Green Crocus (s)**

The old reliable for Chromium Plate, carbon and stainless steel.

Cuts out and finishes the frosted and burned spots on Chromium Plate.



**ZUCKER SONS' CO., Inc.**  
 ROSELLE, N. J.

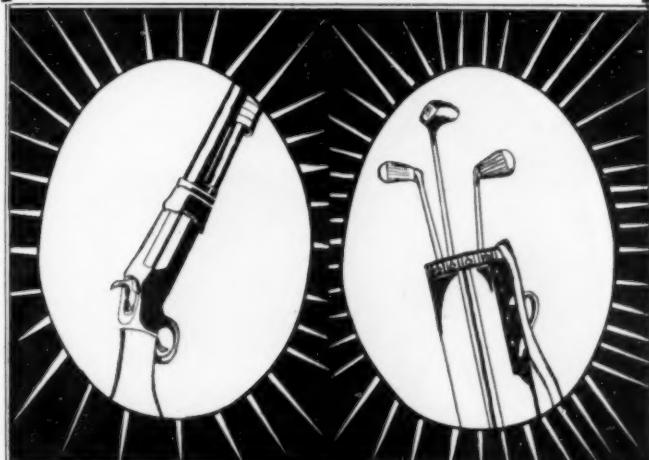


Plate it with

**DU PONT**  
REG. U. S. PAT. OFF.

**CHROMIC ACID**

Samples and Prices on request

**E. I. du Pont de Nemours & Co., Inc.**

*Acid & Heavy Chemical Division*

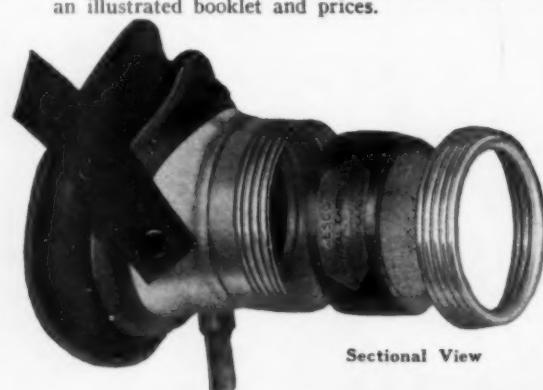
3500 Gray's Ferry Rd., Philadelphia, Pa.      256 Vanderpool St., Newark, N. J.

**CESCO**  
**Chemical Cartridge Respirator for**  
**Chromium Plating**

The CESCO Style No. 77 Respirator has been designed primarily for protection against the deadly fumes encountered in chromium plating. Do not confuse this mask with the old style sponge and filter paper respirator; CESCO Style No. 77 has a replaceable chemical cartridge which purifies all inhaled air. It is extremely light and comfortable to wear and we guarantee it to give absolute protection.

This mask has been thoroughly tested in actual use by several firms doing chromium plating and their verdict has been unanimous, "The CESCO Chemical Cartridge Respirator has solved our problem."

This mask will be sent to any reliable firm for inspection. Write us for an illustrated booklet and prices.



Manufactured by  
**Chicago Eye Shield Company**  
2300 Warren Avenue      Chicago, Illinois  
*America's oldest manufacturers of protective devices  
for the head*

1896

25%

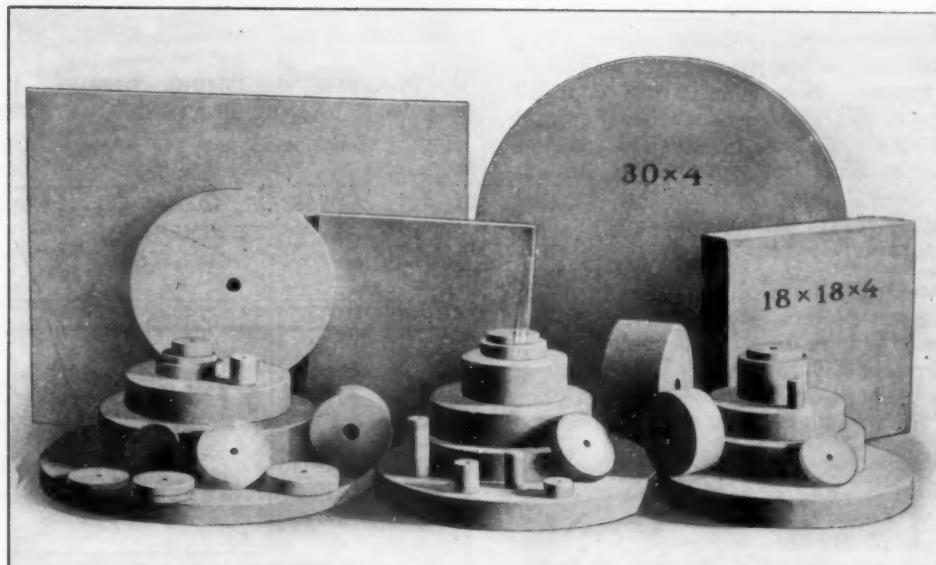
1928

## Cut from Felt Requirements

**Where U. S. A. Brand Felt Wheels Are Used  
Due to Extra Wearing Qualities**

*Watch for the Brand—It Represents Quality Goods*

Any Defect Due to Manufacture  
Replaced Without Charge



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Other Sizes Made to Order

## EASTERN FELT COMPANY

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## Pump parts cleaned in ten minutes

A CERTAIN auto accessory plant makes quick work of cleaning rolled steel parts and steel tubing for hand pumps. A tank is simply charged with a mild solution of Oakite Platers Cleaner and then filled full of the pieces to be cleaned. A ten minute soak—a rinse with hot water—and the job is finished. Oakite cleaning is thorough as well as rapid. Every trace of slushing, cutting and threading oil is completely removed.

In this same plant Oakite methods made it possible to salvage a thousand dollars' worth of the pumps that had been damaged by fire. Scorched enamel and loose rust were readily removed. Every pump barrel, with the exception of those that were warped, came through bright, clean and good as new.

Call the Oakite Service Man near you and ask him to show you how Oakite cleaning methods will benefit you. Just phone or write—it will not obligate you in any way.

Manufactured only by

OAKITE PRODUCTS, INC., 18 Thames St., New York

*Oakite Service Men, cleaning specialists, are located at*

Albany, N. Y., Allentown, Pa., \*Atlanta, Altoona, Pa., Baltimore, Birmingham, Ala., \*Boston, Bridgeport, \*Brooklyn, N. Y., Buffalo, \*Camden, N. J., Canton, O., Charlotte, N. C., Chattanooga, Tenn., \*Chicago, \*Cincinnati, \*Cleveland, \*Columbus, O., \*Dallas, \*Davenport, \*Dayton, O., Decatur, Ill., \*Denver, \*Des Moines, \*Detroit, Erie, Pa., Fall River, Mass., Flint, Mich., Fresno, Cal., \*Grand Rapids, Mich., Harrisburg, Pa., Hartford, \*Houston, Texas, \*Indianapolis, \*Jacksonville, Fla., \*Kansas City, Mo., \*Los Angeles, Louisville, Ky., Madison, Wis., \*Memphis, Tenn., \*Milwaukee, \*Minneapolis, \*Moline, Ill., \*Montreal, Newark, N. J., Newburgh, N. Y., New Haven, \*New York, \*Omaha, Neb., \*Oakland, Cal., Oshkosh, Wis., \*Philadelphia, Phoenix, Ariz., \*Pittsburgh, Pleasantville, N. Y., Portland, Me., \*Portland, Ore., Poughkeepsie, N. Y., Providence, Reading, Pa., Richmond, Va., \*Rochester, N. Y., Rockford, Ill., \*Rock Island, Sacramento, \*San Francisco, \*Seattle, South Bend, Ind., Springfield, Mass., \*St. Louis, \*St. Paul, Syracuse, N. Y., \*Toledo, \*Toronto, Trenton, \*Tulsa, Okla., Utica, N. Y., \*Vancouver, B. C., Waterbury, Conn., Williamsport, Pa., Wichita, Kan., Worcester, Mass.

\* Stocks of Oakite Materials are carried in these cities.

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TRADE MARK REG. U. S. PAT. OFF.  
Industrial Cleaning Materials and Methods

## JOB PLATING

Largest Facilities in  
New York City

Established  
1889



PLATING, POLISHING, DIPPING, LACQUERING,  
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Manufacturers' and Contract Work Our Specialty

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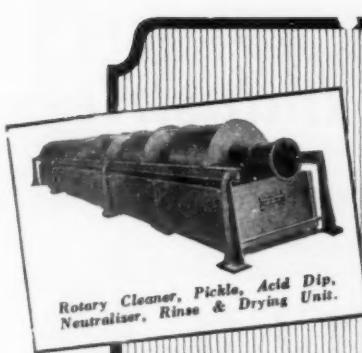
## QUALITY and SERVICE

### AT LOW COST

**Electroplaters and  
Polishers Equipment  
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*We solicit your  
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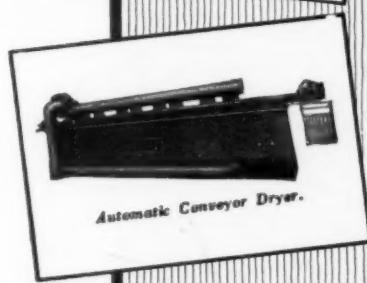
The Thos. Buchanan Company  
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Rotary Cleaner, Pickle, Acid Dip, Neutralizer, Rinse & Drying Unit.



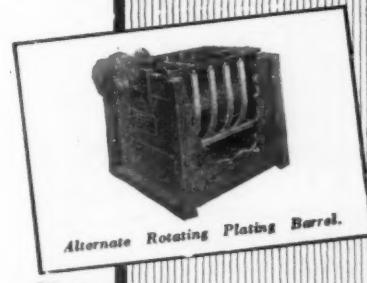
Moving Cathode Plating or Galvanizing Unit.



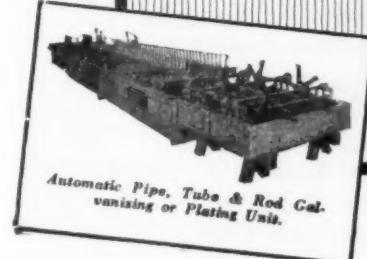
Automatic Conveyor Dryer.



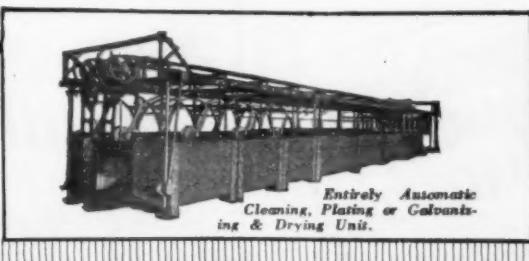
Self-Emptying Plating Barrel.



Alternate Rotating Plating Barrel.



Automatic Pipe, Tube & Rod Galvanizing or Plating Unit.



Entirely Automatic Cleaning, Plating or Galvanizing & Drying Unit.

**EQUIPMENT FOR  
PLATING  
ELECTRO-GALVANIZING  
CLEANING  
PICKLING  
ACID-DIPPING  
NEUTRALIZING  
RINSING  
DRYING AND  
ALLIED OPERATIONS**

ENTIRELY AUTOMATIC  
SEMI-AUTOMATIC  
HAND-OPERATED

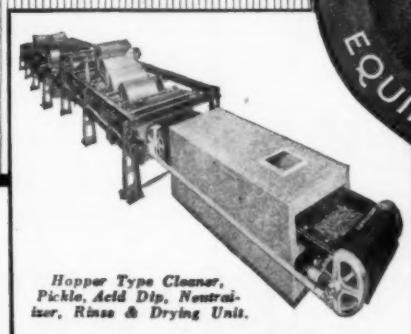
**GENERATORS  
MOTOR-GENERATOR SETS**

*Single Units      Complete Plants*

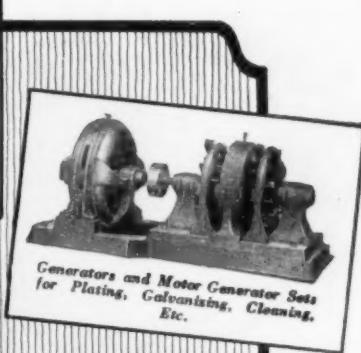
**U. S. Galvanizing & Plating  
Equipment Corporation**

32 Stockton Street      Brooklyn, N.Y.

Manufacturers  
Incorporated 1896



Hopper Type Cleaner,  
Pickle, Acid Dip, Neutralizer,  
Rinse & Drying Unit.



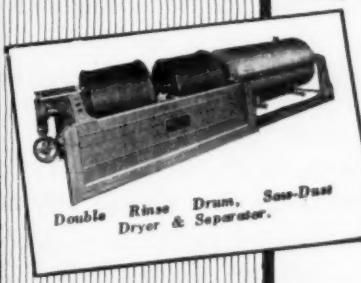
Generators and Motor Generator Sets  
for Plating, Galvanizing, Cleaning,  
Etc.



Rotary Saso-Dust Dryer & Separator.



Drum, Saso-Dust Dryer & Separator.



Double Rinse Drum, Saso-Dust  
Dryer & Separator.





## The Blue Knight's Column

**T**OO often the buyer of finishing materials is on one side of a fence; the seller of lacquers is on the other. More often than not they don't quite get together. As a result enormous savings that might be possible are not achieved. Purely a case of industrial loss through lack of teamwork between buyers and sellers.

I offer to manufacturers a complete finishing material laboratory ready to work out any problem that will improve their production and save them money. Special equipment and specialized experience are at your service.

I'm quoting from a letter I recently sent to a very large manufacturer: "Please bear in mind that the maximum cost of thinner at commercial running of this finish would be \$1.50 per gallon. I hope by further tests at your plant to be able to bring the cost of thinner as low as \$1.35 per gallon."

I would like to do business with you on the ground of helping you to do better business. If there's a fence around your finishing department—cut a hole in it. . . Let me show you what I can help you to accomplish. Address your inquiry to the Service Department . . . no obligation.



ROXALIN FLEXIBLE LACQUER COMPANY  
INCORPORATED  
105-9 SEVENTH AVENUE  
LONG ISLAND CITY  
NEW YORK

**To the  
Metal Industries**  
**We Welcome Inquiries  
Concerning**  
**XCEM**  
**Industrial Cleaners**  
**and Their Application to**  
**Plating and Manufacturing  
Procedure**

Address your communication to us at

950 Park Square Bldg....Boston, Mass.  
5612 North 12th Street....Philadelphia, Pa.  
40 Teaneck Road ..... Ridgefield Park, N. J.  
280 Whalley Avenue .... New Haven, Conn.  
561 E. Illinois Street .... Chicago, Ill.  
216 Brown Street ..... Providence, R. I.  
15 Bryn Mawr Road .... Wellesley, Mass.  
731 Glenn Street, S. W. .... Atlanta, Ga.  
1808 West Bancroft Street. Toledo, Ohio  
230 So. Pennsylvania St....Indianapolis, Ind.

## Magnuson Products Corporation

*Main Office and Works:*

55-57 Third Street, Brooklyn, N. Y.

CHICAGO WAREHOUSE  
North Pier Terminal Company  
561 East Illinois St.

INDIANAPOLIS WAREHOUSE  
230 So. Pennsylvania St.

ATLANTA WAREHOUSE  
731 Glenn Street, S. W.

TOLEDO WAREHOUSE  
500 Broadway

For NEW YORK STATE  
Address Main Office

For WISCONSIN and MICHIGAN  
Address Chicago Office

# THE RICHARDS BARREL PLATER

*PROVEN BEST BY TEST*

**THE FASTEST PLATER**  
NOTHING PLATES BUT THE LOAD



EVERY PLATING PLANT SHOULD  
BE EQUIPPED WITH THIS NEWLY  
INVENTED BARREL.

## KNOWN CHARACTERISTICS

TROUBLE PROOF FRICTION DRIVE  
—NEW DESIGN ALL FORMICA CYL-  
INDER—NO OBSTRUCTING CENTER  
AXLE — CYLINDER GUARANTEED  
FOR ONE YEAR—PLATES RAPIDLY  
WITH EITHER SIX OR TWELVE  
VOLTS. NO DEPOSIT ON CYLINDER.

## GUARANTEED PRODUCTION

MANUFACTURED BY

2828-38  
LaSalle St. LASALCO INC. ST. LOUIS  
MO.

REPRESENTATIVES:

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T. Whitehead, 239 Walnut St., Bellevue, Ky.  
H. A. Talbert, 5559 Beaubien Ave., Detroit  
F. C. Rushton, 1127 La Veta Terrace, Los Angeles



## DON'T SPOIL

Your Chromium Finish by Buffing  
With an Unsuitable Compound

## CHROMBRITE DOES THE WORK

The Cost of This New  
Buffing Composition

**IS LOW**

But the Finish Obtained

**IS HIGH**

CHROMBRITE IS A BUFFING COMPOSITION SPECIALLY DEVELOPED FOR BUFFING  
CHROMIUM. MADE IN TWO GRADES

No. 50 for light cut  
No. 100 for heavy cut  
Write for samples and prices

**LASALCO, INC.** 2828-38 LASALLE ST.  
ST. LOUIS, MO.

**T**his is a special season of the year when business pauses to exchange fraternal greetings, good fellowship, and cement cordial relationships.

We wish also to assure you that our best endeavors will be to maintain always that quality and service which has given character to the



In extending sincere and hearty Christmas Greetings to all, we covet for you an abundance of the best things in life, and may the coming year bring health, increased wisdom, and happiness.

The J. B. FORD CO.  
Wyandotte, Michigan

## You Can't Stop Progress

Every department of the modern manufacturing plant shows the results of scientific progress year after year. New things are invented and old discoveries perfected.

The peak of modern cleaning science is found in Clenesco cleaners and Clenesco technical service.

Each grade of Clenesco is a chemical substance different from any other on the market—developed to a high standard of efficiency and economy. Read our booklet.



THE COWLES DETERGENT CO.  
7016 Euclid Avenue  
Cleveland, Ohio

**CLENEESCO**  
TRADE MARK REG. U. S. PAT. OFF. & CANADA

Nineteen Years of Scientific Cleaning

© CDC



## Chemical Lead Burning

*Lead Chemical Equipment*

### LEAD LINED TANKS

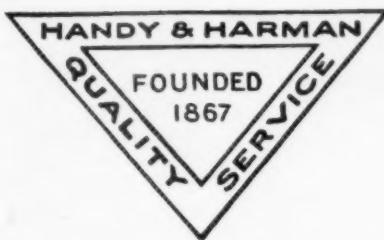
Lead Linings for Tanks, Vats, etc.; Lead Coils; Lead Sleeves; Agitators; Lead, Acid Jugs and Carboys; Acid Waste Line; Lead and Lead Lined Pipe and Fittings; Special Lead Traps and Drain Boxes; Pure Tin Linings for Vessels of Every Character

CHEMICAL LEAD WORK OF EVERY DESCRIPTION

JOHN F. ABERNETHY & CO., INC.  
708-710 Myrtle Ave., Established 1901 BROOKLYN, N. Y.

Use **NATROLIN** "T" for All Metal Cleaning  
and McKeon's *Liquid Sulphur*  
(The Oxidizing Agent of Today)  
Order on approval  
WILFRED S. McKEON, Pres., Greensburg, Pa. Thanks!

**Woven Wood Plating Barrels**  
14" x 24" @ 15.75—We Make All Sizes  
*As superior as they are different*  
B H G SPECIALTY CO., Dayton, Ohio.



## “Handy” Silver Solders for Welding Extruded Bronze

A LARGE iron and wire works finds “Handy” Silver Solders indispensable for welding extruded bronze.

The extruded bronze doorway arch shown at the top of this page consists of two quarter-circle segments, welded in the center with “Handy” silver solder. It is 49 in. diameter, with 3½ in. face, 3 in. depth and weighs about 50 lbs. The weld is made in 6 minutes with an acetylene torch, and “ATT” Handy Solder.

Ordinary hard solders cannot be used with extruded bronze because they require too high a temperature.

### Solve Troublesome Problems

#### *The proprietor said :*

“We find that ‘Handy’ silver solders are just the thing. They solve problems that used to give us a great deal of trouble. These solders flow freely, penetrate quickly and make strong welds. They are especially useful in working with extruded bronze. And they save us money, besides enabling us to turn out better work.”

### Standardized to 12 Formulas

“Handy” Silver Solders have been standardized to 12 formulas, ranging in silver-content from 80% down to 10%; and in melting point from 1325° to 1600° F. Each has its own specific field of usefulness. The reputation of Handy & Harman as authorities in the precious metal field for 61 years, gives peculiar significance to the guarantee of silver-content and uniformity of each of these mixtures.

### Your Problems Are Ours

*Let us help you determine:*

First, whether silver solders are suited to your work.

Second, if so, which formula, lowest in silver and hence least expensive, will give you the best results.

Write us fully describing your soldering problems. We shall be glad to give you advice based on a great deal of Research work or make tests on your samples if your problem is new to us.



### Our “Handy Book of Silver Solder”

contains much valuable information on soldering, welding and brazing. Send for a copy.

## HANDY & HARMAN

*General Offices—57 William St., New York, N. Y.*

*Plants: Bridgeport, Conn.; Providence, R. I.; Fulton and Gold Sts., New York, N. Y.*

# NIKOLAS LACQUERS

SINCE 1890 we have made only superior quality lacquers, because inferior quality is always disappointing, no matter how cheap it may be.

No great success was ever made with an inferior product. That is one reason we don't make it.

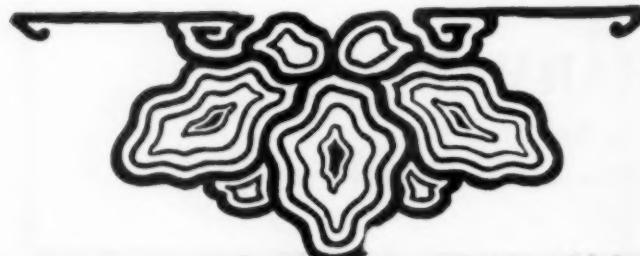
## G. J. Nikolas & Co., Inc.

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CHICAGO, ILL.

*Ask for our Beautiful Color Card. Free!*

### Branches:

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## Built for Service

The latest ECONOMY No. 12 Air Sprayer embodies several new features in a moderately priced Sprayer.



No tools are needed to adjust the Liquid Tube.

Vertical Flat Spray.  
Metal Jar for Lacquer at small extra cost.

Price \$12.00 with Mason Jar

MANUFACTURED BY

*Circulars on request*

**Economy Machine Products Co.**

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SOLD BY ALL LEADING DEALERS

## Ideal $\frac{1}{2}$ Horse Power Portable Air Compressor



This compact, efficient and foolproof outfit, complete as illustrated, is designed for continuous operation and is unconditionally guaranteed for one year of constant service. Can be furnished with or without automatic starter or stopper.

*There is an "IDEAL" Air Brush for every purpose.  
Send for our catalogue.*

**THE IDEAL AIR BRUSH MFG. CO.**  
270 Lafayette Street  
NEW YORK

## THESE CONTACT BUTTONS SPEED UP PRODUCTION



WHY does the Mercil All-Bakelite Barrel beat all production records? Why does it turn out such good work—and do it so quick? Why is it the most talked-of barrel on the market today?

Perfect Current Distribution—that's the answer!

Write for complete information

**MERCIL PLATING EQUIPMENT CO., 1917 Fulton Street, CHICAGO, ILL.**  
HANSON-VAN WINKLE-MUNNING CO., Exclusive Distributors

Contact buttons are placed on every rib at six-inch intervals. They afford an equal simultaneous flow of current to all parts of the load. Result—plating time cut down and production speeded up.

**L-97**

### Gloss Metal Lacquer

**L-97**

**Especially Useful for Bronze and Oxidized Articles  
Brings Up the Color Without Clouding or Obscuring  
Very Transparent**

The film of this lacquer is extremely durable and presents a good wearing surface that does not crack or peel.

**Adhesion Powerful**

**Coverage Generous**

**and can be applied by spray or dip**

If you want a good, dependable finish on metal at a minimum of expense, try this popular lacquer. We would be pleased to figure on your requirements.

**Walker service with Walker Lacquers.**

**HENRY V. WALKER CO.**

No. 17 John St.

New York City, N. Y.



## RIGHT OVER— BOOTS AND BREECHES

**PLUS AGAIN AT 85.15% — HIGHER THAN EVER**

AGAIN THE METAL INDUSTRY IS PROVEN TO BE THE BEST READ PAPER OF INDUSTRIAL PUBLICATIONS.

HERE ARE THE FACTS AS FOUND BY THE AUDIT BUREAU OF CIRCULATIONS.

FOR THE TWELVE MONTHS ENDING JUNE 30, 1928, OUR PERCENTAGE OF RENEWAL SUBSCRIPTIONS WAS 85.15 PER CENT.

THE HIGHEST AVERAGE KNOWN AMONG INDUSTRIAL PUBLICATIONS AND THE HIGHEST AVERAGE EVER ATTAINED BY THE METAL INDUSTRY. A RENEWAL FIGURE OF 85 PER CENT IS CONSIDERED PERFECT. IN THEIR LAST REPORTS OTHER INDUSTRIAL CONTEMPORARIES STATED RENEWAL PERCENTAGES OF—

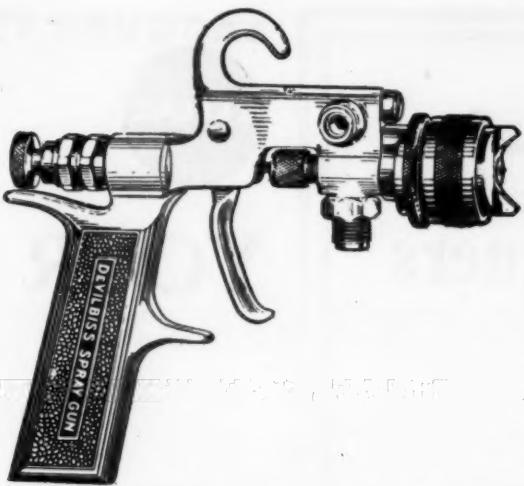
79.12%      73.21%      73.02%      59.27%      58.06%

FOR THREE YEARS "THE METAL INDUSTRY" HAS LED ALL OTHERS. OUR AVERAGE BEING: IN 1928 — 85.15%, 1927 — 82.58%, 1926 — 85.02%.

WITH SUCH A RECORD ADVERTISERS CAN DEPEND UPON THEIR ADVERTISEMENTS BEING READ AND IN THEIR GETTING RESULTS.

**THE METAL INDUSTRY**  
99 JOHN STREET  
NEW YORK

**ABC PUBLICATION ABP**



# LEADERSHIP

*of varied and comprehensive experience*

FOR twenty years the great DeVilbiss organization has been developing spray equipment and methods for use in every field where there is application of paint or finish.

Knowledge gained under many and varied conditions benefits all classes. The furniture finisher benefits by the solution of finish problems of the automobile manufacturer. Contractor and house painter, maintenance departments of industries, institutions, municipalities and boards, finishers of metal parts and products, vitreous enameling, transportation companies, storekeepers and interior decorators—all gain through the application to their individual problems of DeVilbiss experience in their own and other fields.

Thus it is that today DeVilbiss offers to all users the most advanced methods and equipment obtainable for each specialized operation. Thus it is that the comprehensive DeVilbiss line comprises those perfected and ultra-refined products which have revealed the most merit under numerous and diverse conditions of use.

There are many good reasons why you should employ DeVilbiss spray equipment. We will gladly give you counsel and information bearing upon your own particular operation and the equipment best prepared to meet your individual painting or finishing problem.

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Sale

## TOLEDO, OHIO

**New York**      **Philadelphia**      **Cleveland**      **Detroit**      **Indianapolis**  
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**Direct factory representatives in all other territories**

# DeVilbiss Spray-PAINTING FINISHING System

DOES THE WORK OF FIVE MEN

# 50 Years + ? = Good Lacquers

M&W.C.9  
1876

Mere existence for Fifty Years does not make *Good Lacquer*.

However—

1. Many years of Satisfactory Service.
2. An unbroken record of uniformity.
3. An accumulation of Experience in the art of Lacquer Making have contributed to the present—

Reputation for Leadership identified with

## M & W PRODUCTS

Today the best available skill together with advanced technical knowledge of raw materials serve to maintain—

### M & W Quality and Leadership

## MAAS & WALDSTEIN CO.

Executive Offices and Plant  
438 Riverside Ave.  
NEWARK, N. J.

CHICAGO OFFICE AND WAREHOUSE  
1115 W. Washington Boulevard

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1214 Venice Boulevard

LACQUER IT WITH ZELLAC

ZELLAC

## YOUR MONEY'S WORTH

Some business writers are asking lacquer-makers to soft-pedal price-talk and strike full force on quality. Price will never be soft-pedaled so far as Zellac is concerned. But, take notice that when we talk price, we speak of it *only in relation to quality!*

If you are making the mistake of giving too much importance to the *initial price*, you will misjudge Zellac. But if you have learned that initial price is important only after you have obtained economical results with quality—then *Zellac is your lacquer*.

On a basis of highest possible quality at lowest possible cost, Zellac brings you your money's worth—and then some. Let us deliver you a trial order *specially formulated to meet your requirements*. Once we have worked out the correctly-formulated grade for your finishing needs, you can rely on us to deliver uniformity.

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Company of Texas, 1920 North  
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Portland: 403 Hoyt Street  
Wichita: Ormor Sales and Supply  
Co., 452 North Main Street  
Distributors

**ZELLAC**

## IMPERVIOUS CLEAR BREVOLITE

A *weather-resistant*,  
clear Lacquer

If you require such a Lacquer,  
we shall be glad to send you  
sample.

Lacquer a piece of metal with  
Impervious Clear and another  
piece with your present Lacquer,  
then expose to the elements.

You will buy Impervious Clear  
as a result of this exacting test.

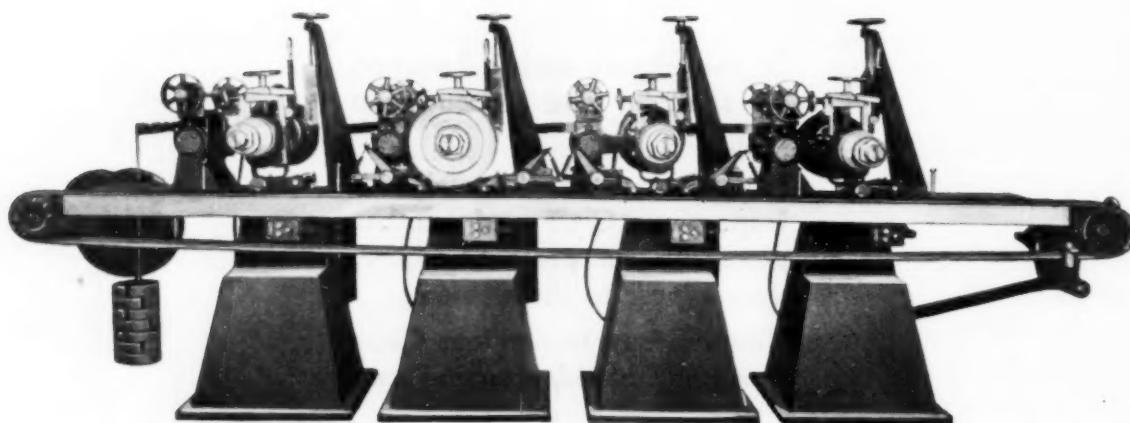
## WAUKEGAN CHEMICAL CO.

*“Values That Endure”*

Waukegan, Illinois



COUPON



**POLISHES AND BUFFS  
AUTOMATICALLY  
ALL KINDS OF MATERIAL**

This automatic polisher and buffer will be found in the polishing rooms of Delco Light Co., Kelly Axe Co., Packard Motor Car Co., Greenfield Tap & Die Co., Peck-Stow-Wilcox, Standard Steel Spring Co., and other representative plants. We show a four unit machine, but it is so constructed that less or more unit wheels can be used to meet individual production requirements.

**Divine Brothers Company**

INCORPORATED  
UTICA, N. Y.

## BETTER BUFFING COMPOSITIONS

**STEVENS TRIPOLI COMPOSITIONS—**In 75% of the Metal Finishing Business, Tripoli composition is used to perform the principal polishing operation on which the final finish depends.

With Stevens Tripoli Composition, when the operation is completely done, it is well done and can be done no better.

We have a grade of Tripoli Composition to meet every condition.

**LIME COMPOSITIONS—**For the final finishing operation, the proper grade of Lime Composition is just as essential as using the proper grade of Tripoli Composition in the first operation.



**WHITE ROSE**—For twenty years a standard in the industry, this product is dry, cuts fast, and leaves the work perfectly finished.

Especially for nickel over non-ferrous metals.

**STEVENS FAST FINISH NO. 2**—Has been perfected for use on Nickel before Chromium—leaving a clean, bright surface on the Nickel which, in many cases, permits the work to go direct to the Chromium tank without cleaning.



## CHROMIUM FINISHING COMPOSITIONS

Successful Chromium Plating demands the use of the right Buffing Composition for every operation—BEFORE the Chromium—as well as AFTER.

**STEVENS NO. 64 TRIPOLI** has been developed especially for this work—unsurpassed for ease and perfection of cleaning, with plenty of lubricating qualities for severe conditions, tough in texture, high melting point, fast cutting—the composition itself does the work and saves the buff.

**STEVENS F. C. DOUBLE DUTY** has just the right cutting and finishing qualities for copper-plated work, before nickelizing.

**STEVENS NO. IV GREEN** Composition for Chromium Plated work cuts fast, leaves the surface clean.

**STEVENS NO. 93 WHITE** Composition and No. 17 F. C. (Faster Cutting) White are two of our newest products for use on Chromium Plated Work, which have been approved by many users after careful tests.

SAMPLES ON REQUEST

## FREDERIC B. STEVENS, Inc.

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Hoosier Supply Co.  
138 South Delaware Street  
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**NEW ENGLAND**  
Frederic B. Stevens, Inc.  
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Manufacturer of Foundry, Electro-Plating and Polishing  
Supplies and Equipment  
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**Corner of Larned and Third Streets**  
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# ZAPON

## PYROXYLIN LACQUERS

### For Every Industrial ~ Purpose ~

*The Acknowledged Standard  
of Quality since 1884*

**THE ZAPON COMPANY**

STAMFORD, CONN.

CHICAGO • CLEVELAND • DETROIT • LOS ANGELES  
NEW HAVEN • NEW YORK • OAKLAND  
PORTLAND • SAN FRANCISCO  
SEATTLE

DEC 11 1928

Volume 26. No. 12

DECEMBER, 1928

# THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED  
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER  
**ELECTRO-PLATERS REVIEW**

Entered as second class matter February 10, 1903, at the post office in New York under the Act of 1889.

**A MONTHLY PUBLICATION RELATING TO THE METAL AND PLATING TRADES**

SUBSCRIPTION PRICE PER YEAR, UNITED STATES AND CANADA, ONE DOLLAR; OTHER COUNTRIES  
TWO DOLLARS. THE METAL INDUSTRY PUBLISHING COMPANY, 99 JOHN ST., NEW YORK, U. S. A.

## MERRY CHRISTMAS!

We are happy to be able to give to the trade  
at this time a new anode

DISTINCTIVE—PRACTICAL—EFFICIENT:

## NUCAST NICKEL ANODES

are

SLUDGELESS — 99% PURE

save

LABOR — CURRENT

are

SOLUBLE

Your Ultimate Purchase — Our Suggestion for a

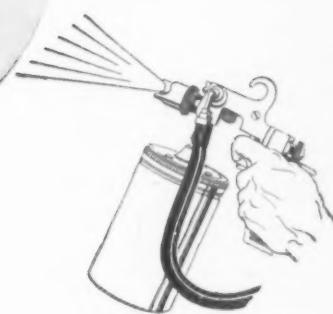
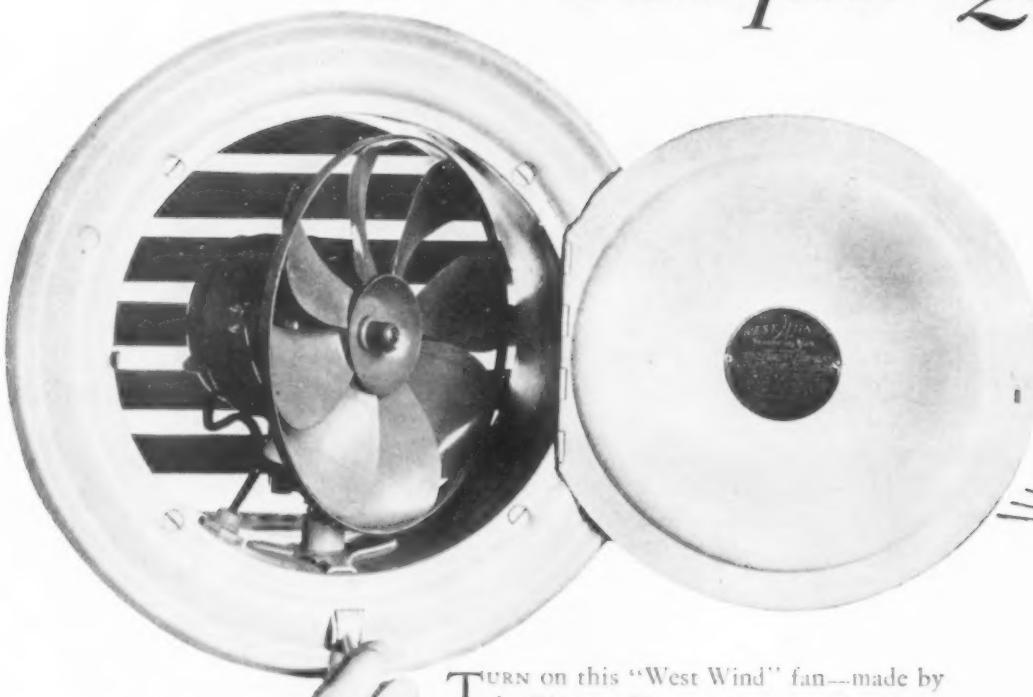
HAPPY NEW YEAR!



**APOTHECARIES HALL COMPANY**  
WATERBURY, CONN.

ESTABLISHED 1849

THIS FAN  
takes all the "hot air"  
out of the *Lacquer Question*



THE MODERN  
"Mist of Beauty"

Egyptian Lacquer, sprayed as a fine mist on a thousand objects, brings them a lustre, a color, a protective finish that defies Time. Thousands of manufacturers are now giving their products the added distinction that brings ready sales with this modern "Mist of Beauty."

TURN on this "West Wind" fan—made by the Western Blower Company, Seattle! It's finished completely in Egyptian Lacquer for beauty, permanence, and *satisfaction*. And its finish helps to *sell* it—for two reasons. The first is, it *looks* as good as it is. The second is, Egyptian Lacquer is nationally advertised, nationally known, and nationally respected.

"Hot air" can't stay in the same room with these cool, crisp, facts and a "West Wind" fan!

# EGYPTIAN

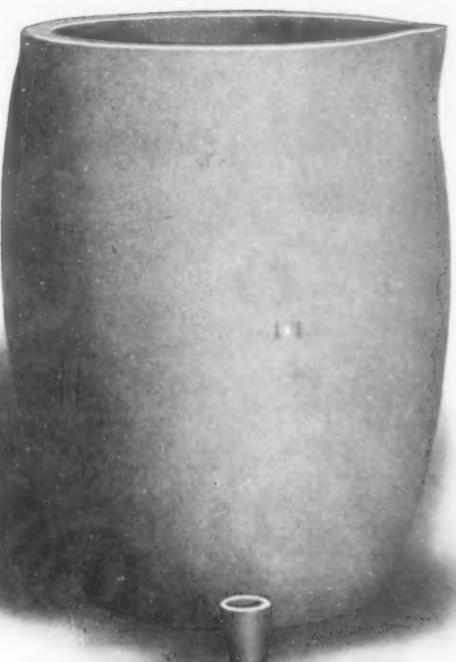
Lacquers

THE EGYPTIAN LACQUER MFG. CO., INC., 90 WEST STREET, NEW YORK

*Completely equipped branches in charge of practical men  
are maintained in the following cities:*

DETROIT • HIGH POINT, N. C. • KANSAS CITY • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • ST. LOUIS

*The maker who is proud of what he makes uses Egyptian Lacquer*



*The LARGEST and Smallest  
Crucible We Manufacture*

## SOUND PRINCIPLES

Faithful adherence to the sound principles of highest quality workmanship and materials, with prompt handling of orders have built our successful business.

We will find it a pleasure to serve you at all times and solicit your business.

### The Naugatuck Valley Crucible Co.

Shelton, Conn.

## THERE IS NO SUCH THING AS A GOOD GUESS!



Taking a temperature reading of bronze with an A5X Pyrometer after the metal is made ready to pour.

Many non-ferrous foundry managers vouch for the accuracy of this statement. Larger scrap piles and smaller profits are the evidence which proves the case so many times.

Read how the Harnischfeger Corporation, Milwaukee, eliminated guess work from their foundry:

*"We find the A5X Pyrometer was a good investment as our Foundry Superintendent states that he would not be without it. It has done away with a lot of guess work and has reduced our scrap which was caused by pouring at improper temperatures."*

Guess work is an expense item which can be eliminated from every foundry by the A5X Pyrometer.

*Clip this advertisement and write for Booklet F-87. It tells all about the A5X.*

230

**Thwing**  
PYROMETERS

THWING INSTRUMENT COMPANY  
3365 Lancaster Ave., Philadelphia, U. S. A.



**DIE CASTINGS**

**20,000 lbs. Cleaned with**

**89¢ worth of INTERNATIONAL**

at the plant of  
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 Chicago, Ill.

**HERE ARE THE DETAILS...**

METALS—Die Castings of aluminum and white brass.

MATERIALS REMOVED—Mineral Oils and Buffing Compositions.

METHOD—Immersion for 15 seconds in a hot solution of International Compound No.85—3½ ounces to the gallon of water.

ADVANTAGES OF INTERNATIONAL COMPOUND No. 85—Dependable cleaning results at a remarkably low cost. No injury or tarnish to die castings.

*International Compound No. 85  
 is only one of several materials  
 that have been developed for the safe  
 and sure cleaning of die castings. If you  
 handle this type of work it will pay you to ask  
 for a Technical Report on your particular  
 problem. No obligation, of course. Just write to*

*Internationally yours,  
 John Bright*



**INTERNATIONAL CHEMICAL CO.**

Philadelphia—Pa.

